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“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away, if they shall entirely cease.”  
—SIR WM. JONES.

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1858.





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The Meteorological Observations from July to December, 1857, pp. xlix.—xvi., are to be taken from Nos. 1 and 2 of 1858, and included in the volume of 1857.



# JOURNAL

OF THE

# ASIATIC SOCIETY.

No. IV. 1857.

*Notes on the distribution of some of the land and freshwater shells of India: Part I.—By W. THEOBALD, JUNR.*

## BIRMAH AND THE TENASSERIM PROVINCES.

In the present paper it is my intention to give a sketch of the distribution of the land and fluviatile shells of certain portions of India, as far as they have been observed, in the hope that my notes may prove a not uninteresting addition to our previous knowledge of the subject, and shew by the great addition now made to the list of known species, how much yet remains to be done in this department of Natural History.

The names used are with scarcely an exception those furnished by Mr. Benson, who has described many of the new species in the *Annals and Magazine of Natural History* for last year, though many still possess merely MSS. names, which, together with the new species described from specimens furnished by me, I have indicated in the following list, by asterisks (\*).

On my first communicating with Mr. Benson, he informed me that but twenty-three species of land shells were authentically known from the Tenasserim Provinces. Of these, four species, which escaped my notice, may here be mentioned to complete the list up to the present time, viz.

*Vitrina Birmanica*, Philippi.

*Bulimus moniliferus*, Gould.

*Cyclophorus perdix*, Sav.

*Leptopoma Birmanum*, Pfr.

## CYCLOSTOMIDÆ.

*Pterocyclos. Benson.*

1.\* *P. pullatus*, B.—Akowtong (on the Irrawaddi R.) Not uncommon.

2.\* *P. cetra*, B.—Maulmein and Phaiethán (on the Tenasserim R.) Not common.

*Cyclophorus. Montfort.*

3. *C. aurantiacus*, Schum.—Tenasserim valley, not common.

4.\* *C. Theobaldianus*, B.—Tenasserim valley, Maulmein, Thait-mio. This shell is no where common. In the Tenasserim valley it equals *C. aurantiacus* in size, but is easily distinguished by its more depressed form, colourless peristome, and flexuous striation. It has the greatest range of any Cyclostomatous shell of the provinces.

5.\* *C. Haughtoni*, mihi.—n. s. Testâ, simili *C. aurantiaco* solidâ nitidiusculâ; carinatâ, superne saturate castaneâ; in decorticatis speciminibus, spirâ lineis albidis ziczac variegatâ. Carinâ, catenatâ, alternata albidâ et castaneâ. Periomphalo albido, fasciis nonnullis castaneis spiralibus lineato. Peristomate vix pallidissime ochraceo, ore interiori cærulescente—Maulmein.

Size  $\frac{1.70}{1.35}$  Major } diameter in inches. This shell I have much pleasure in naming after Capt. Haughton, to whom I am indebted for some fine shells. It occurs abundantly at the "farm caves," and is at once distinguished from all other Tenasserim Cyclophori, by its parti-coloured funiculate keel, which is not the result of abrasion, but is best seen in specimens covered by the epidermis.

6. *C. expansus*, Pfr.—Tenasserim valley. Not rare. This shell varies much in size, from  $\frac{1.70}{1.26}$  to  $\frac{0.80}{0.65}$ .

7.\* *C. affinis*, mihi.—n. s. Testâ, subgloboso-turbinatâ, umbilicatâ, solidiusculâ, castaneo-marmoratâ, haud nitidâ, vix carinatâ; peristomate reflexo, forti, expansiusculo-distorto, pallidissime flavescente, intus cærulescente  $\frac{1.60}{1.36}$  to  $\frac{1.40}{1.12}$  Maulmein.

This shell has no very marked character, unless a distortion in the peristome, one-third from its sutural margin, should prove con-



stant. But two specimens were obtained, of which the measurements are given above.

8. *C. fulguratus*, Pfr.—Thaïet-mio, Rangoon, very common. This fine shell is not rare at Rangoon and becomes very abundant near Thaïetmio. It varies much in size and colour, some specimens are almost colourless,  $\frac{1.80}{1.30}$  to  $\frac{1.03}{0.85}$ .

9.\* *C. cryptomphalus*, B.—Ava. Procured by Mr. Oldham, does not seem to be a plentiful species.

10.\* *C. scurra*, B.—Pegu (province).

11.\* *C. balteatus*, B.—Pegu (province).

12.\* *C. scissimargo*, B.—Phaïethán. Not common.

13.\* *C. calyx*, B.—Akowtong, on the Irrawaddee, not common.

14. *C. cornu-venatorium*, Sav.—Ava. Procured by Mr. Oldham.

15. *C. perdix*, Sav. (Not obtained by me.)

#### *Leptopoma. Pfeiffer.*

16.\* *L. aspirans*, B.—Tenasserim valley, very common.

17. *L. Birmanum*, Pfr.—(Not noticed by me.)

#### *Alycæus. Gray.*

18.\* *A. pyramidalis*, B.—Therabuin hill, near the Tenasserim river. This pretty little shell appears confined to Therabuin hill, where it is not very common. It is of a delicate pink tint.

19.\* *A. amphora*, B. Maulmein and Tenasserim valley. Rare.

20.\* *A. umbonalis*, B.—Akowtong. Not rare.

21.\* *A. sculptilis*, B.—Thaïet-mio. Rare.

22.\* *A. armillatus*, B.—Thaïet-mio. Rare.

#### *Megalomastoma. Guilding.*

23.\* *M. gravidum*, B.—Maulmein. Very common.

24. *M. sectilabre*, Gould.—Yanglaw, on the Tenasserim. Very rare.

#### *Rhaphaulus. Pfeiffer.*

25. *R. chrysalis*, Pfr.—Maulmein. Very rare.

#### *Pupina. Vignard.*

26.\* *P. arula*, B.—Yanglaw, very rare. Among dead leaves.

27.\* *P. artata*, B.—Maulmein. Not uncommon, among dead

leaves and rubbish at the foot of rocks. By the habitat "Maulmein" the "Farm caves" in limestone hills a few miles distant are intended.

*Otopoma.* Gray.

28.\* *O. blennus*, B.—Maulmein. Rare.

*Hydrocena.* Parreyss.

29.\* *H. illex*, B.—Phaiethan. Not rare. On the bare face of limestone rocks.

30.\* *H. pyxis*, B.—Thaïet-mio. Not rare, under stones.

31.\* *H. frustrillum*, B.—Ava. Procured abundantly by Mr. Oldham.

Tabular view of the distribution of the Cyclostomidæ, in Birmah and the Tenasserim Provinces.				Ava.	Thaïet-mio.	Akowitz.	Rangoon.	Maulmein.	Tenasserim valley.
Cyclophorus	cornu venatorium	Sav.	...	*					
*	"	cryptomphalus, B.	...	*					
	"	fulguratus, Pfr.	...	...	*	*	*		
*	"	calyx, B.	...	...	...	*			
*	"	Theobaldianus, B.	...	...	*	...	...	*	*
*	"	Haughtoni, mihi,	...	...	...	...	...	*	
*	"	affinis, mihi,	...	...	...	...	...	*	
*	"	scurra, B.	...	...	...	...	...		
*	"	balteatus, P.	...	...	...	...	...		
	"	aurantiacus, Schurr,	...	...	...	...	...		*
	"	expansus, Pfr.	...	...	...	...	...		*
*	"	scissimargo, B.	...	...	...	...	...		*
*	Alycœus	sculptilis, B.	...	...	*				
*	"	armillatus, B.	...	...	*				
*	"	umbonalis, B.	...	...	...	*			
*	"	amphora, B.	...	...	...	...	...	*	*
*	"	pyramidalis, B.	...	...	...	...	...	...	*
*	Hydrocena	frustrillum, B.	...	*					
*	"	pyxis, B.	...	...	*				
*	"	illex, B.	...	...	...	...	...	...	*
	Rhaphaulus	chrysalis, Pfr.	...	...	...	...	...	*	
*	Megalomastoma	gravidum, B.	...	...	...	...	...	*	
	"	sectilabre, Gould,	...	...	...	...	...	...	*
*	Pupina	artata, B.	...	...	...	...	...	*	
*	"	arula, B.	...	...	...	...	...	...	*
*	Pterocyclos	pullatus, B.	...	...	...	*			
*	"	cetra, B.	...	...	...	...	...	...	*
*	Leptopoma	aspirans, B.	...	...	...	...	...	...	*
*	Otopoma	blennus, B.	...	...	...	...	...	*	

*Helix.* L.

1.\* *H. Oldhami*, B.—Ava. Procured by Mr. Oldham.

2.\* *H. scalpturita*, B.—Ava. What appears to be a small

variety of the same shell occurs at Thait-mio, and nearly approaches *H. similis*, Fer. in aspect, though larger.

3.\* *H. bolus*, B.—Thait-mio. Very abundant at Thait-mio, Prome, Henzada, &c.

4.\* *H. pauxillula*, B.—Thait-mio, where this minute helix is rare.

5.\* *H. mensula*, B.—Thait-mio. Rare.

6.\* *H. hariola*, B.—Thait-mio. Rather rare. Inhabits *Acacia* trees in jungle.

7.\* *H. petila*, B.—Thait-mio. Rare.

8. *H. refuga*, Gould.—Thait-mio and Akowtong. Not very rare.

9.\* *H. pausa*, B.—Akowtong. Not common. Found in gardens on *Areca* Palms, &c.

10. *H. rotatoria*, V. de Busch.—Akowtong. Very common, found in company with the last. This shell is rarely distinguishable from the Sylhet *H. tapeiria*, B. By the aid of a lens however the sculpture is found to be more ornate and flexuous, whilst in the latter it is simply striate.

11.\* *H. tetrina*, B.—Henzada. Common in jungle. The adult shell has a very handsome pellucid appearance. In the rains the foot is too large for immediate retraction.

12.\* *H. molecula*, B.—Rangoon. This little species abounds on the Great Pagoda.

13. *H. aehatina*, Gray.—Maulmein. Very abundant.

14.\* *H. bombax*, B.—Maulmein. Rather rare.

15. *H. honesta*, Gould.—Maulmein. Tenasserim valley. Rather common.

16. *H. Merguiensis*, Philippi.—Maulmein. Tenasserim valley. Common. Seems a var. of the next species.

17. *H. Gabata*, Gould.—Maulmein. Mergui. Common.

18.\* *H. capessens*, B.—Maulmein. Not very rare.

19.\* *H. infrendens*, B.—Maulmein. Not very rare.

20.\* *H. Pylaica*, B.—Maulmein. Not uncommon. This curious little shell resembles the American *H. hirsuta*.

21.\* *H. catinus*, B.—Maulmein. Very rare.

22.\* *H. cassidula*, B.—Maulmein. Rare.

23. *H. delibrata*, B. (*H. procumbens*, Gould)—Maulmein. Tenasserim valley. No where common. This species has a very wide range, being also found near Cherra.

24. *H. refuga* var. *dextrorsa*.—Phaiethan. This dextral var. was only met with at one spot in the Tenasserim valley, where it was not rare; it is curious that *H. refuga* does not occur in the valley, but was first seen at Akowtong.

25. *H. castra*, B.—Pija. Rare. A single specimen of this Darjiling shell was found at Pija between Tavoy and Mergui.

26.\* *H. attegaia*, B.—Phaiethan. Not common.

27.\* *H. arx*, B.—Therabuin Hill. Rare. This hill has afforded many singular forms, no where else met with.

28.\* *H. convallata*, B.—Therabuin Hill. Rare. Another singular shell also met with near Pija on the coast between Mergui and Tavoy.

29.\* *H. biforcata*, B.—Therabuin Hill. A most singular shell, of which but one adult specimen was procured.

30.\* *H. ceryx*, B.—Phaiethan Hill. Rare.

31.\* *H. artificiosa*, B.—Phaiethan. Not rare, but nowhere else found.

32.\* *H. causia*, B.—Phaiethan. Rare.

33.\* *H. forabilis*, B.—Phaiethan. Very rare.

34.\* *H. perpaula*, B.—Phaiethan. Very rare.

35.\* *H. levicula*, B.—Phaiethan. Rare.

36.\* *H. petasus*, B.—Phaiethan. Not rare.

37.\* *H. precaria*, B.—Phaiethan. Very rare.

38. *H. Saturnia*, Gould.—Tenasserim valley. Rare.

39. *H. anceps*, Gould.—Tenasserim valley. Common.

40. *H. retrorsa*, Gould.—Tenasserim valley. Common.

41.\* *H. acerra*, B.—Mergui. Common.

42. *H. resplendens*, Philippi.—Tenasserim valley.

43. *H. Theodori*, Philippi.—Yanglaw. Very rare.

Tabular view of the distribution of  
Helices in Birmah and the  
Tenasserim Provinces.

Tabular view of the distribution of Helices in Birmah and the Tenasserim Provinces.				Ava.	Thaïet-mio.	Akowitzong.	Rangoon.	Maulmein.	Tenasserim Valley.			
									Mergui.	Therabuin Hill.	Phaïethan.	Yanglaw.
*	Helix	Oldhami, B.	...	...	*							
*	"	scalpturita, B.	...	...	*							
*	"	bolus, B.	...	...	...	*						
*	"	pauvillula, B.	...	...	...	*						
*	"	mensula, B.	...	...	...	*						
*	"	hariola, B.	...	...	...	*						
*	"	petila, B.	...	...	...	*						
	"	refuga, Gould,	...	...	...	*						
*	"	pausa, B.	...	...	...	*						
	"	rotatoria, V. de Busch,	...	...	...	*						
*	"	textrina, B.	...	...	...	*						
*	"	molecula, B.	...	...	...		*					
	"	achatina, Gray,	...	...	...		...	*				
*	"	bombax, B.	...	...	...		...	*				
*	"	capessens, B.	...	...	...		...	*				
*	"	infrendens, B.	...	...	...		...	*				
*	"	Pylaica, B.	...	...	...		...	*				
*	"	catinus, B.	...	...	...		...	*				
*	"	cassidula, B.	...	...	...		...	*				
	"	dchibrata, B.	...	...	...		...	*	*			
	"	Merguiensis, Philippi,	...	...	...		...	*	*			
	"	Gabata, Gould,	...	...	...		...	*	*			
	"	honestata, Gould,	...	...	...		...	*	*	*	*	
	"	castra, B.	...	...	...		...	...	*			
	"	refuga var. dextrorsa,	...	...	...		...	...	...	...	*	
	"	Saturnia, Gould,	...	...	...		...	...	*	*	*	
	"	retrorsa, Gould,	...	...	...		...	...	*	*	*	
*	"	acerra, B.	...	...	...		...	...	*			
	"	resplendens, Philippi,	...	...	...		...	...	*		*	
	"	anceps, Gould,	...	...	...		...	...	*	...		
*	"	arx, B.	...	...	...		...	...		*		
*	"	convallata, B.	...	...	...		...	...		*		
*	"	biforcata, B.	...	...	...		...	...		*		
*	"	attegaia, B.	...	...	...		...	...			*	
*	"	ceryx, B.	...	...	...		...	...			*	
*	"	artificiosa, B.	...	...	...		...	...			*	
*	"	causia, B.	...	...	...		...	...			*	
*	"	forabilis, B.	...	...	...		...	...			*	
*	"	perpaula, B.	...	...	...		...	...			*	
*	"	levicula, B.	...	...	...		...	...			*	
*	"	petasus, B.	...	...	...		...	...			*	
*	"	precaria, B.	...	...	...		...	...			*	
	"	Theodori, Philippi,	...	...	...		...	...			...	*

*Hypselostoma. Benson.*

44.\* H. tubiferum, B.—Thaïet-mio. This singular little anos-

tomatous shell was only met with at one spot on limestone rocks, near the Coal mines, where it did not seem very rare.

*Streptaxis. Gray.*

45. *S. Petiti*, Gould.—Maulmein. Tenasserim valley. Common.

*Vitrina. Draparnaud.*

46. *V. Birmanica*, *Philippi*, was not met with by me.

*Cryptosoma. Mihi, n. g.*

Testâ vitrinæ simile, sed robustiore. Peristomate obtuso haud tenue. Animale, penitus intra testam retractile, et in æstivationis tempore, solido epiphragmate obtecto.

47. *C. præstans*, (*Vitrina præstans*) Gould.—Maulmein. Martaban. Tenasserim valley.—I have separated this shell from *Vitrina*, as the animal is perfectly retractile, and the peristome is thicker than in *Vitrina* proper, and not membranous. It is common in holes in laterite at Martaban and not rare throughout the Tenasserim Valley. Its colour is a bay olive Cajiput green.

*Succinea. Draparnaud.*

48. *S. semiserica*, Gould.—Tavoy. Tenasserim Valley. Not rare.
49. *S. (ined.)*.—Rangoon. A small species, rather rare.

*Bulimus. Scopoli.*

50. *B. perversus*, var. *atricallosus*, Gould.—Tenasserim Valley. Common. Dextral and sinistral shells occur in equal numbers.

51. *B. Janus*, Pfr.—Procured alive from dealers in Mergui, and said to come from the neighbourhood. Dextral and sinistral shells equally common.

- 52.\* *B. Theobaldianus*, B.—Yanglaw. Very rare.

- 53.\* *B. putus*, B.—Akowtong. Rather rare.

54. *B. insularis*, Ehr.—Below Ava. Procured abundantly by Mr. Oldham.

55. *B. gracilis*, H.—A little shell which seems to be this species is common from Thaitet-mio to Tavoy.

56. *B. moniliferus*, Gould.—Not met with by me.

*Achatina. Lamarek.*

57. *A. tenuispira*, B.—Thaïet-mio. Akowtong. A slender var. of this Darjiling species is not uncommon at the roots of Bamboo clumps near Akowtong.

*Pupa. Lamarek.*

58. *P. bicolor*, Hutton. (*P. mellita*, Gould).—Thaïet-mio, Tavoy. This little species is widely spread, but nowhere abundant. It is usually found in moist earth in company with *Bulimus gracilis*.

*Clausilia. Draparnaud.*

59. *C. insignis*, Gould.—Maulmein. Very rare. Tenasserim Valley. Not common.

60. *C. Philippiana*, Pfr.—Maulmein. Tenasserim Valley. Very common.

*Auricula. Lamarek.*

61. *A. dactylus*, Pfr.—Mergui. Not common. In Mangrove swamps.

62. *A. glans*, B.—Amherst. At the mouth of the Salween or Maulmein river. Rare.

*Pythia.*

63. *P. plicata*, Fer. Ava (teste Oldham.) Maulmein. Common.

Tabular view of the distribution of various Burmese Helicidæ.					Ava.	Thaïet-mio.	Akowtong.	Rangoon.	Maulmein.	Tenasserim Valley.
* <i>Hypsclostoma tubiferum</i> , B.	...	...	...	...	...	*				
<i>Streptaxis Petiti</i> , Gould,	...	...	...	...	...	...	...	...	*	*
<i>Cryptosoma præstans</i> , Gould,	...	...	...	...	...	...	...	...	*	*
<i>Succinea semiserica</i> , Gould,	...	...	...	...	...	...	...	*	...	*
" (ined.),	...	...	...	...	...	...	...			
<i>Bulimus atricallosus</i> , Gould,	...	...	...	...	...	...	...	...	...	*
" <i>Janus</i> , Pfr.	...	...	...	...	...	...	...	...	...	*?
* " <i>Theobaldianus</i> , B.	...	...	...	...	...	...	...	...	...	*
* " <i>putus</i> , B.	...	...	...	...	...	...	*			
" <i>insularis</i> , Ehr.	...	...	...	...	*					
" <i>gracilis</i> , H.	...	...	...	...	...	*	*	*		
<i>Achatina tenuispira</i> , B.	...	...	...	...	...	*	*			
<i>Pupa bicolor</i> , H. ( <i>mellita</i> , Gould),	...	...	...	...	...	*	*	?	?	*?
<i>Clausilia insignis</i> , Gould,	...	...	...	...	...	...	...	...	*	*
" <i>Philippiana</i> , Gould,	...	...	...	...	...	...	...	...	*	*



Total Cyclostomidæ,	Genera,	...	...	...	...	9	
" "	Species,	...	...	...	...	31	
							<hr/>
" "	"	...	...	...	...	"	31
" Helicidæ	Genera,	...	...	...	...	10	
" "	Species,	...	...	...	...	60	
							<hr/>
" "	"	...	...	...	...	"	60
" Auriculidæ.	Genera,	...	...	...	...	2	
" "	Species,	...	...	...	...	3	
							<hr/>
							3
							<hr/>
Grand Total,						...	94
							<hr/>

June 8th, 1857.

*Practical Notes on the best mode of obtaining the highest duty from Burdwan Coal as compared with English Coal.—By HENRY PIDDINGTON.*

1. I assume in this paper that the coal supplied is the average good Burdwan Coal ; for there can be no doubt that a great deal of inferior, shaly, stuff has been from time to time sold as Burdwan Coal, and hence, and from the cause which I shall subsequently indicate, arises its bad reputation amongst engineers. I assume also that the boiler furnace is one with "joggle bars."

2. Perfectly pure coal should contain no earthy matter whatsoever, but this is rarely, perhaps never, met with. Good English Pit Coal contains from 8.00 to 0.8 per cent. of earthy matter ; the average of such as has been examined here being 2.8 per cent. and the Welsh Steam Coal 2.0 per cent. An average of several analyses of good Burdwan Coal gives from 12 to 15 per cent. as the proportion of earthy matters ; so that we have

English Pit-Coal.	Best Welsh Steam Coal.	Burdwan Coal.
2.8 pr. ct.	2.0 pr. ct.	13½ pr. ct.

3. I do not refer here to the iron and sulphur, of which most coal contains varying proportions ; because I am not so much writing a chemical as a practical paper, and while the iron on the one hand is usually included in the earthy matters, the Burdwan Coal on the other does not contain much sulphur.



4. Again: every engineer knows that some coal contains too large a proportion of gaseous matter and too little carbon (coke); so that though it will light and flame up easily, and thereby raise the steam quickly, yet it does not leave a good bed of glowing coke to keep it up steadily for a long time, and is thus both a wasteful and so to say an *uncertain* coal; wasteful because it burns away too fast, and uncertain as giving at one time too much steam and another too little. And moreover an improper coal for sea-going Steamers as they can only carry a given quantity.

5. The opposite kind, where there is too little gas and too much carbon, raises steam slowly and is apt to coke and clinker and the fire to get slack, for it then approaches to a coke or anthracite fire in a coal furnace. And thus the steam is apt to get low.

6. Again as to the earthy matter. Up to a small per centage, say perhaps 5 per cent. it does not do harm when burnt in coal, though it tells heavily in the coke, and it perhaps keeps the coal together while burning; but being incombustible itself, if this proportion is exceeded, the burning of the coal is to a certain extent impeded, and the coal clinkers very much, so as to require constant, and to the firemen, fatiguing attention. And there is much waste in the clinker which, when examined, will be usually found to contain a considerable proportion of coke in the cinder.

7. The gaseous contents of coal and its carbon are also to be considered, and here we have from the same authority as before.

	Gaseous.		Carbon.
English Pit Coal, . . . . .	31.00	....	67.3
Welsh Coal, . . . . .	29.25	....	68.75
Burdwan Coal, . . . . .	36.2	....	50.2

We have therefore in the Burdwan Coal an excess of gaseous matter and a deficiency of about 18 per cent. of carbon (coke) of which  $13\frac{1}{2}$  per cent. is made up by earthy matter and the remainder by water, of which it usually contains from 4 to 8 per cent.

8. We build Steamers, such as they are, in India; but their machinery is sent out from England, where the engineers and boiler-makers have no idea of these peculiarities in our Indian Coal, and of course construct their furnaces for burning English Coal, and as our officers and engineers know little or nothing also of

Indian Coal, except that it is a troublesome coal—that it clinkers excessively; and sometimes, where they get a large proportion of inferior kinds in their lot,—that *the steam cannot be kept up with the Burdwan Coal*—they are clamorous for English Coal,—and get it. We are thus in very many cases trying TO BURN INDIAN COAL ON ENGLISH GRATES! and are always complaining that we do not succeed.

9. I have succeeded, and on a large scale, when boiling sugar in open pans, in obtaining, not the duty of English Coal from Burdwan Coal, but something much higher than could be looked for—say within ten or fifteen per cent. of English Coal, and without *much* more trouble, except in a little more work with the picker, which the men carefully attended to because the furnaces being constructed to burn their own smoke, which they did very completely, the men, who were well paid, were liable to a fine, if the smoke-flag was seen for any length of time at the top of the chimney.

10. And I managed this by the following simple expedient.

*Whenever I had Burdwan Coal to burn, I took out one of the bars and steadied the others by bits of scrap iron put in between their shoulders. This increased the air-way and the Burdwan Coal then burnt freely, but of course gave a larger quantity of its white ash.*

11. The reason of this is simple enough. If we suppose a given quantity of English, or Welsh, Coal to perform its highest duty as a steam coal, in any given time, with, say a certain number of cubic feet of air, which we will call 1000, we have first a coal containing say  $2\frac{1}{2}$  per cent. of earthy matter requiring this amount of air in a given time.

12. But it is clear that a coal containing 12 or 15 per cent. will require a much larger amount of air in the same time. We do not know *how* much, or what is the proportion in which the earthy matter obstructs the combustion of the coal in which it is contained; but we do certainly know that every question of combustion from Canuel Coal to Anthracite is a question of draft, and of air-way; of the rapidity of the passage of the air, which is the draft, and of the size of the spaces through which this draft passes, which is the air-way.

13. Now as we can only alter our funnels by reducing them, which we do not want to do, the draft is a constant quantity, and hence the resource is that which I have spoken of above—to increase

the air-way. I have spoken there of taking out *one* fire bar, but I am not sure that where the shoulders of the bars are narrow or the furnace large, this would be enough; yet to take out two would perhaps leave the spaces so wide, that the small coal would fall through before it was burnt? and it should not be forgotten that these questions, though without very accurate experiments and measurements we can only estimate them roughly, are really questions of nice adjustment.



*Notes on Kokán, Kashghár, Yárkand, and other places in Central Asia.—By Lieut. H. G. RAVERTY, 3rd Regt. Bombay, N. I., Assistant Commissioner, Multán.*

About six years since, the Right Hon'ble B. Disraeli, M. P., at the prayer of the sisters of the unfortunate Lieutenant Wyburd of the Indian Navy, at that time supposed to be in slavery at Kokán, the capital of one of the petty states of Central Asia, had, by a motion in the House of Commons, endeavoured to rouse the British Government to effect his release.

This officer had been despatched from Persia to Bokhárá for the purpose of making enquiry into the fate of Stoddard and Conolly, and had never returned. He appears to have been sold into slavery by the ruler of Bokhárá.

Some months previous to the motion of Mr. Disraeli, an agent, said to have been despatched by the reigning chief of Kokán, had arrived at Pes'háwar, with information, that a European calling himself Wypárt, was then in confinement in that city under the suspicion of being a spy of the Russians (with whom the Kokán chief was at enmity); but that he protested he was an Englishman and had escaped from slavery at Bokhárá. The agent in question, I was informed, had stated the readiness of the Chief to release the unfortunate man, if any British officer were sent for that purpose, and would satisfy him as to his being a British subject.

As soon as I became aware of these circumstances, I tendered my humble services, both to the Government of Bombay, and the

Supreme Government, and offered to proceed through Kashmír and endeavour to effect the release of the officer in question.

Quite by accident I met with a Jew at Bombay, who had accompanied Dr. Hoff on his journey to Bokhárá, and who readily offered to accompany me; and two respectable natives of Kokán itself, who were returning to their native land from the pilgrimage to Mekkah, were ready to attach themselves to me, and answer for my safety, if necessary.

I was therefore sanguine of success, but, I am sorry to say, my services were not accepted; and it appears that a native was despatched on the mission, who, as might naturally have been expected, failed. He has lately returned, and from the exceedingly meagre account of his journey, published in the Journal of the Society, No. IV. of 1856, he appears to have gone to very little trouble in the matter, and to have confined himself to asking questions in bazars, and in despatching natives of the country to the adjacent districts for the same purpose. Whether he was duly accredited to the Chief of Kokán or otherwise, does not appear.

There is very little chance of the unfortunate officer, or European whoever he may have been, being still in the land of the living; the unfulfilment of that hope, so long deferred, which maketh the heart sick, must long since have brought to a termination the earthly troubles of the wretched captive.

For a number of years, I have made it a rule to collect every item of information respecting the geography, inhabitants, and resources of the little known parts of Central Asia. What I had already gleaned, at the time I offered to proceed to Kokán, and information furnished by the two Kokánies, I have referred to, I now submit, as giving a better and more minute, although still very meagre, account of this important and little known country, than that furnished by the unsuccessful agent, Khwájá Ahmad, Nakshbandí.

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Kokán, originally called Kokand, Korán, and Khoká, the capital of Audján or Ferghánah, the native country of the Emperor Báber, is a large, populous, and well built city, surrounded by numerous

gardens, for which it is celebrated throughout Túrkestan. The city has considerably increased under the rule of the present Khán, Muhammad Omar,\* son of Muhammad Alí Khán, during whose reign the city of Khojend became depopulated.

The houses of the city are generally built of wood, of several stories in height, with a foundation of burnt bricks. There are several large and well supplied bázárs, many of which, according to the general fashion in oriental cities, are covered in. It has one college, and several large Kárawánserais for merchants.

The Arg or citadel, in which the Kháu resides, a small city in itself, is situated west of the city, being divided by a large rivulet, a feeder of the Sirr, Jihún or Jaxartes river, which divides the two from north to south. The city is therefore amply supplied with water, which is considered to be one of the principal causes of its prosperity, its present population being at present computed to be about 100,000, half of whom dwell in houses, the remainder are nomades who dwell in tents.

The ruler, Muhammad Omar Khán is very popular. He hears all the complaints of his subjects, and administers justice to them in person every day, and settles their disputes.

This city is remarkable for the number of its public women, called in the Kattai (Northern China) language, Aghelhha. They amount to about 4,000; and may be seen driving about the city, in carriages drawn by horses, at all times of the day.

Great quantities of opium, *chirs*, an intoxicating drug made from hemp flowers, and a decoction made from poppy-heads (different from opium), are made here. In every bázár numbers of people may be seen in all states and degrees of intoxication, and no one interferes with them; indeed people may do just as they choose here, with the exception of acting tyrannically, such are the Khán's commands. Tyranny and oppression in this city will not answer.

The ruler is on friendly terms with the Khán of Khwárazm, but no intercourse takes place with the Russians, Bokharáíáns, or Chinese. He has a standing army of about 55,000 men, with thirty

\* Said to have been dethroned since the above was written. His son Khuda Yar, is the present ruler.



guns, the whole of which, however, are not mounted. The private soldier's pay amounts to about ten tillahs, each tillah being worth about fourteen shillings English.

The country is small in extent, and surrounded by mountains on all sides, with the exception of the south-west, in which direction the city of Khojend is situated. Round about the city the country is densely populated, and well cultivated and fruitful. All kinds of grain, fruits, and other necessities are plentiful and exceedingly cheap. Flocks and herds are also numerous.

The principal taxes levied from the agriculturists are ten per cent. on grain; on the value of sheep, goats, and cattle five per cent.; on the sale of a camel three tangas; on a horse two; on a sheep one. Merchandise is subject to a duty of two and a half per cent., and as the trade is very extensive, it yields a large revenue to the Khán. The inhabitants have to pay a yearly tax of one tillah on each house.

The chief towns of the Khánát of Kokán are; Murghelándasht, distant about thirty-six miles; Kársandasht, thirty-five miles; Muangándasht, about the same distance; Takht-Súlímán-dasht or Ush, thirty-four miles; Karghar-kohistán, sixty miles, and other places of less size.

The road lies through a desert tract of country, and no signs of habitation or cultivation are seen except in the vicinity of the different *manzils* or stages. The range of mountains, called the Takht or throne of Súlímán, lies to the west of the city of Kokán, distant about one hundred miles. It has two peaks.

On the arrival of a Kárawán at the *Ourtang* or Custom-house, the chief revenue officer who is stationed there, personally inspects the merchandise, and makes out two lists of the contents. One copy he transmits to Azím Khán, the Kattai chief, and retains the other himself. After due examination of the goods he grants a pass to the merchants, and they can then proceed on to Káshghár.

On approaching any *Ourtang* or Custom-house, on a journey, it is necessary for the Káfilah Báshí, or leader of the Kárawán, to proceed there on foot, and show his pass; as it is considered insulting to approach a government establishment on horseback or mounted.

In cases where any doubt may arise respecting the goods being more or less than specified in the pass, the trouble these revenue authorities give is most vexatious; nevertheless, should any article mentioned in a pass be lost or stolen on the road they are prompt in recovering it. On such a circumstance occurring the conductor of the *Kárawán* must report it at the nearest Custom-house, giving a description of the goods whatever they may be. The authorities have a stated time for the decision of such matters, and in case the articles are not recovered within the prescribed period, some compensation is allowed, but in kind, not in money.

On a *Kárawán* or *Káfilah* reaching the city, or any other place in the *Khán's* dominions, where duties are leviable, the conductor must report his arrival at the chief Custom-house, stating all particulars, from whence he has come, together with the value, and description of goods he may have brought. On this an officer proceeds to inspect the merchandize, and on goods of superior quality five per cent. on the value is levied, and on commoner descriptions half the above rate.

The city of *Táshkend* is subject to *Kokán*, and lies ten stages or *manzils* to the north-west. It was once a very large and rich city, but is now gone to decay. The numerous ruins of mosques and other buildings shows what its former extent must have been.

The city of *Kashghár* lies south-east from *Kokán*, and is distant from it ten *manzils* for *Kárawán* camels. It belongs to Chinese Tartary, is populous, and contains about 50,000 inhabitants. It is surrounded by a fortified wall, which is very strong and lofty, and said to be very ancient. The citadel, which is within the *enceinte*, occupies an area of about two miles, and is garrisoned by 2,500 soldiers, with several pieces of artillery. An army of Chinese troops is also stationed here as being a frontier city. It formerly amounted to 10 or 12,000 men, but lately the force has been considerably augmented, and at present is computed at 30,000 men. The chief cause of this increase, however, appears to be for the purpose of overawing the *Muhamadans*, who constitute the majority of the inhabitants. Some time previously they created a serious disturbance, in which a great number of Chinese were killed and an immense amount of property

plundered. A strong body of celestial troops was sent to quell this revolt, and the faithful were severely punished.

The residence of the governor, who is styled Umbán, is called the Gúl Bágh, distant about two miles from the city, between which a portion of the troops are encamped.

The city gates are closed from sunset to sunrise, as is the custom throughout Northern China. Each soldier of the city police, which is a well organized body of men, is provided with two pieces of wood called a *chang*, and at the termination of each watch of about three hours, he produces a sound by striking them together in a peculiar manner, and afterwards calls out the hour of the night or day. These soldiers go by the general name of Hallátts.

The country is very productive, and the city, the houses of which are regularly laid out, is surrounded by numerous gardens. There are six gates which are defended by cannon, and a number of mosques. The chief fiscal authority is vested in a Muhammadan who bears the title of Hákím Beg.

The people are a lively comely race, and the women are remarkably handsome. Merchants may take temporary wives, as in Persia, by entering into a contract for a specific sum during the period of their sojourn in the country. The Káshgháris are also great wine-bibbers, and are very old women in their fondness for a "dish of tea."

The lands depend in a great measure on rain for irrigation, but artificial irrigation is also extensively adopted, and this, from the number of streams running through the country, is by no means difficult. Snow lies on the ground in winter to the depth of two, and sometimes three feet, but never for more than a few days together.

The distance from Káshghár to Yárkand is three *manzils*, of about seventeen miles each. As the country all along the line of route is highly cultivated and exceedingly populous, the different stages are not prescribed to certain places, as between Káshghár and Kokáu. The Yárkiaug river, also called the Ergo-ú, flows past the city to the north.

Yárkand, which is the largest city of Moghalistán, has two citadels within its walls, one in which the Muhammadan go-



vernor dwells, and the other, on the southern side, where the Chinese chief, who commands the army quartered here, resides.

This force, which is intended to overawe the Yárkandis amounts to about 40,000 men with several guns. This is the largest force the Chinese have in this direction of their empire, and the best and most efficient, being picked men. They are relieved yearly. Of this force, 10,000 are quartered within the city, the remainder in the vicinity.

The police arrangements are similar to those of Káshghár, with this exception, that an equal number of Chinese soldiers are associated with the police in their duties; and one celestial accompanies each of the *cháng nawázán* (ringers or strikers of the *cháng*) as the watchmen already described are called, in his rounds.

Russian Kárawáns come here, and bring all sorts of European manufactures, consisting of hardware in a greater proportion. They take back with them teas, silk, and other articles of Chinese manufacture, but they are not allowed to proceed further east.

From Yárkand, distant fifteen *manzils* or stages to the north-east is Áksú (*ák*, white, *sú*, river), a city whose wealth and population increase steadily every year. All descriptions of food are excessively cheap, and even when prices are at their maximum, a *maund* and a half of grain, Kábul measure, (about one hundred and twenty pounds English) may be obtained for two shillings. The governor of this city is appointed by the Chinese, but the people are chiefly followers of Islám.

From Áksú to Yílih or Ileh is ten days journey to the north-east. The road is difficult on account of the traveller having to cross the glaciers of the Tiáchán or snowy mountains. A body of fifty men are maintained here by the authorities for the express purpose of assisting travellers over the mountains, and for making roads for their passage through the ice. When a party of travellers reach the foot of the mountains, they proceed in front, and make a road over the ice as they advance, the travellers following close at their heels; and it generally occupies a whole day in crossing the range. So quickly does this track become impassable, that the pioneers, who return on the following day, have generally to clear a new path for themselves. This place is called by the people of the country,

*Makán-i-Sarwar jádúgar*, or the "dwelling of Sarwar the magician." Showers of rain, and snow storms are of daily occurrence in this vicinity.

Yílih or Ileh contains about 8,000 houses and 40,000 inhabitants, consisting of Chinese and Muhammadans in about equal numbers, whose quarters are quite separated from each other.

The chief authority of the province is styled the Jáu Jang or Governor-General, who resides at Kowrah or Kowreh, one stage from Yílih. It contains upwards of 60,000 inhabitants, and a Chinese army of about 40,000 men are located there. The authority above named, is the supreme head of the Muhammadans of Moghastán, to the west; eastward is the country of Khattai, or Chinese Tartary.

From this latter city to the Russian frontier town of Semí Pulád Oská (Semipolatsk) the most southerly town of any consequence in Southern Siberia, is twenty-five days' journey through a difficult country almost uninhabited. This mountainous district is rich in silver mines which are profitably worked by the Chinese. They also produce a metal known here by the name of yámbú. Some years since the Russians demanded a share in the profits from these mines on account of their being situated mid-way between the two countries. The Khattais, as the Chinese are called, refused, however, to accede to the demand, giving answer (I here use the very words of my informant) "If you Orús have six laks of soldiers altogether, we have six laks in one place alone, then what occasion is there for us to let you have a share in the mines?"

The town of Semí Pulád Oská contains a population of between 7 and 8,000. It is situated on the right bank of the river Irtisch, which forms the boundary between the two countries, and at the foot of the Altai or golden mountains.

From the frontier city of Kowreh, or Kúrá, distant fifteen stages, is Karán-sheh or Kára-shehr, beyond which, there is a most stringent order not to permit Yáwahs (barbarians), as the Chinese term all foreigners, to pass into the interior. This is a large and populous city with a numerous garrison, or army rather for its protection.

Muliyán is distant from the above place five stages, Kután or Kotán fifteen, and Túsán twenty. To reach Má-chín, from whence

the tea is chiefly brought, it occupies two months and half with a Kárawán; and to reach Jánán, where the China-ware is manufactured, it takes another three months. Beyond the last mentioned place is the ocean.

The Chinese are much given to pleasure, and once a year, in the first month, they hold a grand festival which lasts for ten days, during which time they give themselves up to all sorts of pleasure. The festival is called Chághán.

Cottrell in his "Recollections of Siberia," refers to this style of commencing the new year in the following terms: "They (the Chinese merchants at Mai-má-chín, the small hamlet where they and the Russians meet to trade, and in which merchants are allowed to reside) have, however, learned from their Russian neighbours to appreciate the merits of champagne, which is drunk in torrents in the *white month*. This white month is the beginning of the Chinese year. \* \* \* \* The scene of carousing and gaiety during this month is described as most amusing, and would be doubtless the best opportunity of seeing the Chinese under the most favourable colours."

The dress of the men of Chinese Tartary is of various colours, one suit over the other; and their caps they ornament with a tassel like the girls of Orgunge, to which according to their means, they attach jewels. Their shoes are of silk with soles of cotton. The women dress much in the same style as those of Kashmir, and their head-dress consists of a cap or turban, which they ornament with flowers made of coloured silks. All the people use chairs, in fact they cannot sit comfortably otherwise.

They are of two tribes, the Akh Khattai, and Karah Kattai, which signifies in the Túrki language, the White and the Black Chinese. The former shave all round the head, but leave a tuft in the centre, the hair of which when sufficiently long they twist and allow to hang down like a cow's tail. They also shave off the beard but retain the moustache. The latter, on the contrary never shave.

There are two routes from Kashmir to Yárkand and Kokán. The most direct one is by way of Iskárdoh and along the banks of the Shighún river, and over the Musták range of mountains by the Hanzí pass. The other, a more round about road, is by way of

Leh or Ladákh, through the valley of the Shai Yak, as the northern branch of the Indus is named, and over the Karah Korrum mountains, which appears to have been the route followed by the Sayed. There is another route from Leh to the Karah Korrum range, further to the west by way of Núbra, but it is only used when the Shai Yak is too deep to be crossed. The route by Iskárdoh is less than the other by ten stages, but it is only open from the middle of April to the end of October, whilst the Leh route is practicable, though difficult, for the greater part of the year.

*Multán, 10th April, 1857.*

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*Memorandum on the Nanga Parbat and other Snowy Mountains of the Himalaya Range adjacent to Kashmir.—By T. G. MONTGOMERIE, Lt. Engineers, 1st Asst. Gt. Trig. Survey of India, in charge Kashmir Series.*

Colonel Waugh having given me permission to publish the approximate heights and positions of the Nanga Parbat and other snowy mountains fixed by the Kashmir series, I have the pleasure to put at the disposal of the Asiatic Society a memorandum of the same with tables, &c. shewing how the height of the Nanga Parbat has been obtained.

The mean height of 26,629 feet for the Nanga Parbat is approximate, but is not likely to alter materially when all the refinements of computation have been applied.

The height of the stations of the Kashmir series depend upon the N. W. Himalaya series, and as yet the N. W. H. series depends upon the height of the Bauog observatory, which Colonel Waugh has already tested by trigonometrical levelling from sea to sea\* over 2,127 miles of hill and plain—a test that has never before been applied or at any rate successfully carried out on such a gigantic scale.

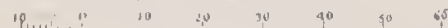
The N. W. H. series thus starting with a verified height has not as yet been tested by a process similar to the above. Before long, however, Colonel Waugh's great geodetical quadrilateral that

\* From Calcutta to Bombay and Kurrachee.

19' 1800

SNOWY PEAK. ADJACENT TO

Scale 32 Miles = 1 inch



(Sd) - *G. Montgomery* Esq<sup>r</sup>  
15, Adelphi St. Survey of India  
In Charge of the Kashmir Series



NOTE

Longitudes referable to Madras Observatory taken at  $80^{\circ} 17' 21''$

Heights referred to Barmy Observatory taken at 7454 Feet

Small  
white Simula in Taper





embraces the Punjab and Sind will afford the verification desired by completing the circuit from the mean sea level at Kurrachee, round the Punjab and back to the same point.

Though the internal checks on the heights of any G. T. Survey series are in themselves complete, still slight errors may creep in which can only be detected on the completion of the levelling from sea to sea. Hence a small correction may hereafter be applied to the heights of the Kashmir series, though as I before said, it is not likely to affect materially the values that I now send you.

Hitherto the Nanga Parbat, which is also called Dayarmur, has been put down as 19,000 feet above the sea, being nearly a mile and a half below its actual elevation. Rather a bad shot for conjectural geography.

Though by no means equal to mount Everest,\* still the Nanga Parbat is as much the king of the northern Himalayas as mount Everest is the king of the southern Himalayas.

My series has already added to the G. T. Survey all the peaks to the south of the Indus, and now the G. T. Survey may be said to have fixed all the peaks in the Himalayas with the exception of a few about the sources of the river Indus.

During my three days' residence on the snowy mountain Haramook, at upwards of 16,000 feet above the sea, I had several fine views of the Karakooram range and of the ranges to the north of the Indus. Amongst others two very fine peaks were visible beyond the general outline of the Mustagh and Karakooram ranges. These two peaks promise to be high. They were well but faintly defined against the sky being probably about 150 miles from me. I hope to have the pleasure of sending you their heights at the beginning of next year.

The memorandum includes several well known mountains such as "Ser" and "Mer," Haramook, Baltal, &c. The heights now given do not agree with those that have hitherto been taken for granted by former explorers.

I trust the accompanying heights and positions may prove a useful and interesting contribution to accurate geography.

*Dhera Dhoon, 27th January, 1857.*

The geographical co-ordinates of the Himalayan peaks enumerated in the accompanying list have been derived from the geodetical operations of the Kashmir meridional series of the G. T. Survey of India.

This series commenced by order of Colonel Waugh in 1855, emanates from a side of the north-west longitudinal series in the low ranges north of Sealkote.

The triangulation of the series has been carried across the snowy ridge of Chattardhar, over the Pir Panjal and the great range to the north of Kashmir, by means of symmetrical quadrilaterals and polygons.

Luminous signals\* have been used throughout, and the rigorous system of the G. T. Survey of India has nowhere been abated, notwithstanding the physical difficulties presented by the snowy ranges, and the severe climate on their summits, so trying to the natives of India employed as lampmen and heliotropers.

The Nanga Parbat or Dayarmur is a snowy mountain to the north of Kashmir, midway between that valley and the river Indus. The splendid mass of snow presented by this peak and its subordinate pinnacles can be seen to the best advantage from the western side of Kashmir, when it is viewed across the great Walpar lake. The upper portion of the mountain for 5,000 feet is precipitous, and the neighbouring ranges never attain an altitude of more than 17,000 feet, consequently this magnificent peak, rising to an elevation of 26,629 feet above the sea, naturally forms a noble object† in whatever aspect it is viewed.

Among the remaining mountains there are many fine peaks, the most remarkable being "Ser" and "Mer," twin giants, the former white and the latter dark, because it is too precipitous to retain much snow on the Kashmir side. Ser and Mer are also called Nana Khana, as well as Dum Huy and Pajah Huy, besides other appellations. These peaks and all from No. 1 to No. 12 are well known to those sportsmen who shoot ibex in the Wardwan valley.

\* Heliotropes and lamps.

† For a beautiful and characteristic sketch of this mountain, vide page 44, of Major (now Lt.-Colonel) Cunningham's work on Ladak.



Baltal, Haramook, the highest points of the Pir Panjal and Nos. 16 to 27 inclusive are visible from various parts of Kashmir.

The position and heights of these mountains have been determined by observations taken at the principal stations of the Kashmir series. For instance the Nanga Parbat has been determined by observations with a 14 inch\* theodolite from eleven principal stations at distances varying from 43 to 133 miles and at heights ranging from 7,700 to 16,000 and odd feet.

Four or more independent computations have been made for each point, the accompanying abstract of the results of the computations of the Nanga Parbat may be taken as a fair specimen. In this instance, the latitude and longitude have been derived from seven independent deductions, the heights from eleven, and the distances from the same number of triangles. The extreme difference from the mean is only one-tenth of a second in latitude and longitude, and only 25 feet in height, being as accordant as could be expected, considering that it is an unmarked peak,† that the attraction of the mountains is very great, and that no doubt, between observations, variations did occur caused by falls of snow at one time, and by the melting of the same at another.

The refraction used for completing the height of the Nanga Parbat as well as of the other peaks has throughout been determined practically from my own reciprocal observations between principal stations, that is to say from observations to and from those elevated points of the Himalayan range, which were actually occupied for the purpose of observation while extending the series of great triangles across the Pir Panjal and the great snowy barrier to the north of the valley.

The skeleton chart shows the geographical position of the Nanga Parbat and the other peaks in the accompanying list. The position of Murree, Jhelum, Sealkote, Srinagar, and other places being added for the sake of illustration.

\* Troughton and Simms, No. 5, G. T. S.

† The term unmarked in the G. T. S. means a peak in which no signal mark has been erected.

*Abstract of the position of the Nanga Parbat.*

| No. | Fixed Stations.           | Deduced Stations. | Latitude.        | Longitude.       | Remarks. |
|-----|---------------------------|-------------------|------------------|------------------|----------|
| 1   | From Safapoor, H. S. . .  | Nanga Parbat.     | ° ' " 35—14—21.4 | ° ' " 74—37—52.5 |          |
| 2   | „ Kaj Nag, H. S. . .      | .... do. ....     | 21.5             | 52.4             |          |
| 3   | „ Manganwar, H. S. . .    | .... do. ...      | 21.6             | 52.6             |          |
| 4   | „ Marinag, H. S. . .      | .... do. ....     | 21.6             | 52.5             |          |
| 5   | „ Ismailde dori, H.S. . . | .... do. ....     | 21.5             | 52.5             |          |
| 6   | „ Haramook, H.S. . .      | .... do. ....     | 21.5             | 52.4             |          |
| 7   | „ Hant, H. S. . . . .     | .... do. ....     | 21.6             | 52.5             |          |
|     | Means, . . . . .          | .....             | 35—14—21.5       | 74—37—52.5       |          |

Compared by W. G. Beverley, and T. J. M.

## Kashmir Series.

| Astronomical Date.                                   |                                | Eye Stations.         | Object Stations.      | Observed Vertical Angles. | Geodetic Distance. |         | Log. correction for height of Eye Station. | Contained Arc. | Object and Eye Corrections. |          |        |        | Terrestrial Refraction.    |               | Apparent Vertical Arcs. | Subtended Angle. | Given Elements.         |                    | Elements Deduced.  |                      |                          |               |       |
|------------------------------------------------------|--------------------------------|-----------------------|-----------------------|---------------------------|--------------------|---------|--------------------------------------------|----------------|-----------------------------|----------|--------|--------|----------------------------|---------------|-------------------------|------------------|-------------------------|--------------------|--------------------|----------------------|--------------------------|---------------|-------|
| 1856.                                                | Appt. Time.                    |                       |                       |                           | Log. Feet.         | Miles.  |                                            |                | Signal.                     | Heights. |        | Angle. | Decimals of contained Arc. | Seconds.      |                         |                  | Stations.               | Heights above Sea. | Stations.          | Comparative Heights. | Heights above Sea Level. | Mean Heights. |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             | feet.    | feet.  |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               | feet. |
| June 1st, .....                                      | h. m.<br>1 11                  | Safapoor II. S.       | Nanga Parbat S. P.    | E. 2 14 9.31              | 5.5441063          | 66.339  | + .000                                     | Seconds.       | feet.                       | feet.    | feet.  | "      | (1)                        | 193.60        | E. 2 14 12.35           | 2 39 47.32       | Safapoor II. S.         | 10309.2            | Nanga Parbat S. P. | + 16307.6            | 26616.8                  | feet.         |       |
|                                                      |                                | Nanga Parbat S. P.    | Safapoor II. S.       |                           |                    |         |                                            | 3157.13        | + 0.00                      | + 5.17   | + 5.17 | + 3.04 | 0.056                      |               | D. 3 5 22.28            |                  |                         |                    |                    |                      |                          |               |       |
| June 5th, ... {<br>„ 6th, ... {<br>Sept. 27th, ... { | 21 11<br>20 28<br>6 6<br>18 58 | } Poshkar II. S.      | Nanga Parbat S. P.    | E. 1 50 56.41             | 5.6112711          | 83.491  | 1733                                       | 4350.98        | + 0.00                      | + 5.15   | + 5.15 | + 2.41 | (2)                        |               | E. 1 50 58.82           |                  | } Poshkar II. S.        | 8337.0             | Nanga Parbat S. P. | + 18293.8            | 26630.8                  |               |       |
|                                                      |                                |                       | Nanga Parbat S. P.    | Poshkar II. S.            |                    |         |                                            |                |                             |          |        |        | 0.066                      | 287.16        | D. 2 53 55.18           |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| June 14th, ... {<br>„ 19th, ... {                    | 7 1<br>19 42<br>22 18          | } Raj Nag II. S.      | Nanga Parbat S. P.    | E. 1 39 59.88             | 5.5892670          | 73.559  | 2520                                       | 3833.34        | + 0.00                      | + 5.13   | + 5.13 | + 2.72 | (2)                        |               | E. 1 40 2.60            |                  | } Raj Nag II. S.        | 12124.6            | Nanga Parbat S. P. | + 14492.2            | 26616.8                  |               |       |
|                                                      |                                |                       | Nanga Parbat S. P.    | Raj Nag II. S.            |                    |         |                                            |                |                             |          |        |        | 0.061                      | 233.83        | D. 2 36 8.28            |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| June 23rd, .....                                     | 19 13                          | Manganwar II. S.      | Nanga Parbat S. P.    | E. 3 4 7.35               | 5.4717617          | 56.510  | 1814                                       | 2944.88        | + 0.00                      | + 5.14   | + 5.14 | + 3.55 | (2)                        |               | E. 3 4 10.90            |                  | } Manganwar II. S.      | 8728.4             | Nanga Parbat S. P. | + 17892.4            | 26621.2                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Manganwar II. S.      |                           |                    |         |                                            |                |                             |          |        | 0.061  | 179.64                     | D. 3 47 16.50 |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| June 28th, .....                                     | 18 53                          | Marinag II. S.        | Nanga Parbat S. P.    | E. 3 9 18.41              | 5.3886051          | 46.342  | 2458                                       | 2414.94        | + 0.00                      | + 5.16   | + 5.16 | + 1.35 | (2)                        |               | E. 3 9 52.76            |                  | } Marinag II. S.        | 11827.5            | Nanga Parbat S. P. | + 14804.2            | 26631.7                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Mariuag H. S.         |                           |                    |         |                                            |                |                             |          |        | 0.061  | 147.31                     | D. 3 45 13.08 |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| July 4th, .....                                      | 20 8                           | Ismail de dori II. S. | Nanga Parbat S. P.    | E. 1 58 12.59             | 5.5274885          | 63.805  | 2628                                       | 3325.01        | + 0.00                      | + 5.17   | + 5.17 | + 3.16 | (2)                        |               | E. 1 58 15.75           |                  | } Ismail de dori II. S. | 12643.2            | Nanga Parbat S. P. | + 13995.4            | 26638.3                  | 26629.4       |       |
|                                                      |                                | Nanga Parbat S. P.    | Ismail de dori II. S. |                           |                    |         |                                            |                |                             |          |        | 0.061  | 202.83                     | D. 2 46 55.10 |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| Sept. 10th, .....                                    | 5 50                           | Haramook II. S.       | Nanga Parbat S. P.    | E. 1 33 40.07             | 5.4955023          | 59.275  | 3328                                       | 3088.93        | + 0.00                      | + 5.06   | + 5.06 | + 3.33 | (2)                        |               | E. 1 33 43.40           |                  | } Haramook II. S.       | 16014.8            | Nanga Parbat S. P. | + 10605.2            | 26620.0                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Haramook II. S.       |                           |                    |         |                                            |                |                             |          |        | 0.061  | 188.42                     | D. 2 18 55.49 |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| Sept. 15th, .....                                    | 19 34                          | Hant II. S.           | Nanga Parbat S. P.    | E. 3 1 26.28              | 5.3577864          | 43.167  | 2804                                       | 2249.51        | + 0.00                      | + 5.23   | + 5.23 | + 1.73 | (2)                        |               | E. 3 1 31.01            |                  | } Hant II. S.           | 13492.8            | Nanga Parbat S. P. | + 13153.1            | 26645.9                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Hant II. S.           |                           |                    |         |                                            |                |                             |          |        | 0.061  | 137.22                     | D. 3 34 26.08 |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| May 28th, 1855,                                      | 21 24                          | Ahertatopa II. S.     | Nanga Parbat S. P.    | E. 0 14 10.62             | 5.8489099          | 133.745 | 2725                                       | 6970.12        | + 0.00                      | + 5.20   | + 5.20 | + 1.52 | 0.054                      | 376.39        | E. 0 14 12.14           |                  | } Ahertatopa H. S.      | 13042.5            | Nanga Parbat S. P. | + 13576.8            | 26619.3                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Ahertatopa H. S.      |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         | D. 1 57 19.48    |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| July 6th, 1855,<br>May 24th, 1856,                   | 6 40<br>2 5                    | } Gogipatri II. S.    | Nanga Parbat S. P.    | E. 1 32 43.35             | 5.7006088          | 95.055  | 1629                                       | 4953.68        | + 0.00                      | + 5.20   | + 5.20 | + 2.14 | (2)                        |               | E. 1 32 45.49           |                  | } Gogipatri II. S.      | 7765.7             | Nanga Parbat S. P. | + 18859.4            | 26625.1                  |               |       |
|                                                      |                                |                       | Nanga Parbat S. P.    | Gogipatri II. S.          |                    |         |                                            |                |                             |          |        |        | 0.061                      | 302.17        | D. 2 45 14.83           |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |
| Augt. 31st, 1855,                                    | 19 3                           | Pahargurh II. S.      | Nanga Parbat S. P.    | E. 0 37 52.85             | 5.7972697          | 118.751 | 2378                                       | 6188.66        | + 0.00                      | + 5.20   | + 5.20 | + 1.71 | (1)                        |               | E. 0 37 51.56           |                  | } Pahargurh II. S.      | 11369.3            | Nanga Parbat S. P. | + 15285.5            | 26651.8                  |               |       |
|                                                      |                                | Nanga Parbat S. P.    | Pahargurh II. S.      |                           |                    |         |                                            |                |                             |          |        | 0.056  | 346.57                     | D. 2 9 30.08  |                         |                  |                         |                    |                    |                      |                          |               |       |
|                                                      |                                |                       |                       |                           |                    |         |                                            |                |                             |          |        |        |                            |               |                         |                  |                         |                    |                    |                      |                          |               |       |

Note.—H. S. denotes Hill Station.

S. P. Snowy Peak. E. elevation and D. depression.

(1) Determined by reciprocal observations before the rains.  
(2) Ditto ditto during ditto.



*Memorandum of Heights and Positions of the Nanga Parbat and  
other Mountains.*

| Names of Mountains.                                                    | Mean<br>Height. | Mean<br>Latitude. | Mean<br>Longitude. | Remarks.                                      |
|------------------------------------------------------------------------|-----------------|-------------------|--------------------|-----------------------------------------------|
|                                                                        | feet.           | o ' "             | o ' "              |                                               |
| Nanga Parbat Snowy<br>Peak, .....                                      | 26,629.1        | 35 14 21.5        | 74 37 52.5         | Or Dayamur.                                   |
| Ser ditto, .....                                                       | 23,406.9        | 33 58 56.1        | 76 3 59.1          | } Or Nana, Khana, &c.<br>Or Gwashbrari.       |
| Mer ditto, .....                                                       | 23,264.4        | 34 0 47.7         | 76 5 51.4          |                                               |
| Baltal ditto, .....                                                    | 17,839.4        | 34 9 55.4         | 75 22 10.3         |                                               |
| Haramook ditto, .....                                                  | 16,902.9        | 34 24 5.6         | 74 57 3.1          |                                               |
| Kashmir Series, Snowy<br>Peak, No. 1, .....                            | 16,662.0        | 33 11 18.8        | 76 5 35.3          |                                               |
| Ditto, " 2, .....                                                      | 19,906.0        | 33 19 18.1        | 76 20 22.7         |                                               |
| Ditto, " 3, .....                                                      | 21,288.6        | 33 27 18.9        | 76 11 50.9         | A Snowy Cone.                                 |
| Ditto, " 4, .....                                                      | 20,051.2        | 33 27 22.5        | 76 7 23.8          |                                               |
| Ditto, " 5, .....                                                      | 21,059.3        | 33 30 15.4        | 76 5 30.6          | A fine Snowy Cone.                            |
| Ditto, " 6, .....                                                      | 21,584.8        | 33 36 26.6        | 76 10 25.8         |                                               |
| Ditto, " 7, .....                                                      | 18,739.3        | 33 34 53.1        | 76 1 39.0          |                                               |
| Ditto, " 8, .....                                                      | 20,988.0        | 33 44 1.6         | 76 9 28.8          |                                               |
| Ditto, " 10, .....                                                     | 19,841.3        | 34 0 22.4         | 75 52 58.3         |                                               |
| Ditto, " 11, ..                                                        | 19,597.0        | 34 6 14.9         | 75 45 42.1         |                                               |
| Ditto, (Poormandal ke<br>Sir,) No. 12, ..                              | 17,051.9        | 34 3 37.3         | 75 33 49.1         | [Kashmir & Wardwan.<br>East of a pass between |
| Kashmir Series, Snowy<br>Peak, No. 16, .....                           | 17,014.5        | 34 56 7.4         | 74 21 43.1         |                                               |
| Ditto, " 17, .....                                                     | ..              | 34 53 30.6        | 74 18 59.9         |                                               |
| Ditto, " 19, .....                                                     | 20,740.3        | 35 7 55.7         | 74 28 42.2         |                                               |
| Ditto, " 21, .....                                                     | 14,874.5        | 34 48 41.7        | 74 5 51.3          | Above Khágán.                                 |
| Ditto, " 22, .....                                                     | ....            | 34 46 49.4        | 73 55 51.1         | Ditto.                                        |
| Ditto, (Peer ke dheri),<br>No. 23, .....                               | 16,486.6        | 34 43 30.9        | 73 46 0.2          | Ditto.                                        |
| Ditto, (Bijti-ke-Sir),<br>No. 24, ..                                   | ..              | 34 38 18.6        | 73 43 41.4         | Ditto.                                        |
| Ditto, (Neelá) No. 25,<br>Kashmir Series, Snowy<br>Peak, No. 26, ..... | 15,534.5        | 34 35 55.1        | 73 41 43.4         | Ditto.                                        |
| Ditto, " 27, .....                                                     | 16,227.8        | 35 0 45.7         | 74 13 22.4         |                                               |
| Ditto, " 29, .....                                                     | ..              | 34 56 26.8        | 74 34 6.6          |                                               |
| Ditto, (d), .....                                                      | 18,062.4        | 34 22 15.4        | 75 29 29.7         |                                               |
| Ditto, (e), .....                                                      | 17,320.7        | 34 13 34.4        | 75 32 4.5          | Above the Ambernáth<br>caves. [Glacier.       |
| Ditto, (f), .....                                                      | 17,903.7        | 34 13 43.9        | 75 37 40.3         | Above the Matchahoy                           |
| Ditto, (i), .....                                                      | 17,642.7        | 34 30 50.3        | 75 38 30.4         | In the Hembaps Range.                         |
| Ditto, (j), .....                                                      | 17,369.3        | 34 31 34.4        | 75 44 27.6         | Ditto, ditto.                                 |
| Ditto, (x), .....                                                      | 19,376.7        | 34 17 23.6        | 75 49 59.2         | About 8 miles S. W.<br>of Dras fort.          |

## Memorandum of Heights, &amp;c., (continued).

| Names of Mountains.                        | Mean Height. | Mean Latitude. | Mean Longitude. | Remarks.                                                                      |
|--------------------------------------------|--------------|----------------|-----------------|-------------------------------------------------------------------------------|
|                                            | feet.        | o ' "          | o ' "           |                                                                               |
| Pir Panjal Snow Pk.<br>Bará Sangali, ..... | ....         | 33 57 54.4     | 75 26 18.3      | In the range between Kashmir and Wardwan.                                     |
| Ditto ditto $\alpha$ , .....               | 14,580.6     | 33 48 54.3     | 75 29 51.9      | Ditto.                                                                        |
| Ditto ditto $\beta^1$ , .....              | ....         | 33 36 31.5     | 75 34 33.8      | Ditto.                                                                        |
| Ditto ditto $\beta^5$ , .....              | 14,545.6     | 33 26 5.9      | 75 31 31.6      | Ditto.                                                                        |
| Ditto ditto $\beta^6$ , .....              | 14,187.0     | 33 31 59.7     | 75 32 10.4      | Ditto.                                                                        |
| Ditto ditto Ahertátópá,                    | 13,042.5     | 33 23 56.8     | 75 22 21.5      | G. T. Station.                                                                |
| Ditto ditto Kol Nárwá,                     | 12,746.4     | 33 30 21.8     | 75 8 24.5       | Ditto.                                                                        |
| Ditto ditto Didyum,                        | 14,952.2     | 33 24 49.5     | 75 3 15.6       | Ditto seen from Siálkote.                                                     |
| Ditto ditto Bármá Sá-<br>kul, .....        | 15,482.7     | 33 28 55.7     | 74 52 44.2      | Three peaks above the Kosa Nag, called also Koserin Kutur seen from Siálkote. |
| Ditto ditto Tikhiár, ..                    | 15,304.6     | 33 29 52.0     | 74 39 42.2      | ..... seen from Siálkote.                                                     |
| Ditto ditto Táttá kúti,                    | 15,523.7     | 33 44 54.9     | 74 30 30.6      |                                                                               |
| Ditto ditto ( $\gamma$ ), .....            | 15,132.7     | 33 54 23.6     | 74 28 19.1      |                                                                               |
| Northern Panjal Hánt,                      | 13,492.8     | 34 36 48.0     | 74 39 16.2      | G. T. Station above the road from Bundipoor to Gurys.                         |
| Ditto Marinág, .....                       | 11,827.5     | 34 38 47.2     | 74 14 46.2      | G. T. Station.                                                                |
| Ditto Ismail de dori, ..                   | 12,643.2     | 34 29 44.5     | 73 57 44.3      | Ditto.                                                                        |
| Ditto Peak, No. 2, ...                     | 14,338.1     | 34 21 20.3     | 73 59 17.6      |                                                                               |
| Ditto Satkolá, ...                         | 14,038.8     | 34 20 41.8     | 74 0 23.9       | G. T. Station.                                                                |
| Ditto Káj Nág, No. 1,                      | 14,437.8     | 34 13 48.7     | 74 4 12.6       | Highest Peak.                                                                 |
| Isle of Chinárs, ...                       | 5,209.4      | 34 8 0.9       | 74 53 40.9      | In city lake of Kashmir.                                                      |
| Lanká Island, .....                        | 5,186.6      | 34 22 9.1      | 74 39 48.0      | In Great Walar Lake.                                                          |
| Takht-i-Sulaimán, ....                     | 6,266.0      | 34 4 46.3      | 74 53 8.0       | Base of kalis of temple.                                                      |
| Islámábád Hill, .....                      | 5,896.4      | 33 43 46.3     | 75 12 6.9       | G. T. Station on top.                                                         |
| Shapiyon Hill, .....                       | 7,048.9      | 33 42 43.9     | 74 53 48.5      | Ditto.                                                                        |
| Sopoor Fort, .....                         | ....         | 34 17 1.4      | 74 30 47.6      | East Bastion.                                                                 |

Farther Observations taken at Kanúrí Nár H. S. by Lieut. Brownlow, Engrs. to the two peaks observed at Haramook H. S. by Lieut. Montgomerie, Engrs. in September, 1856, give the following results.

|                                            | Height in feet. | Distance in miles. |
|--------------------------------------------|-----------------|--------------------|
| Karakoram No. 1 { from Haramook H. S. .... | 25,393.7        | 116.7              |
| { „ Kanúrí Nár, .....                      | 25,438.5        |                    |
| Mean,...                                   | 25,416.1        |                    |
| Karakoram No. 2 { from Haramook H. S. .... | 27,914.4        | 136.5              |
| { „ Kanúrí Nár, .....                      | 27,942.2        |                    |
| Mean,...                                   | 27,928.3        |                    |

The most northerly of the above viz. No. 2 is nearly in Lat. 36°.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1857.

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At a monthly General Meeting of the Asiatic Society, held on the 3rd instant, Babu Ramgopaul Ghose, Vice-President, in the chair.

The proceedings of the last meeting were read and confirmed.

*Presentations were received—*

1.—From Mr. C. Gubbins, C. S., a fragment of a carved brick, found among the Sarnath ruins, near Benares.

2.—From the Bavarian Royal Academy of Sciences, the latest publications of the Academy.

3.—From Professor E. B. Cowell, on behalf of the translator, Mr. Fitzgerald, a copy of a translation of Salámán Absál of Jámi.

4.—From Major H. L. Thuillier, a sketch of the country between Agra and Umballah with a sketch of Delhi.

Dr. William Crozier, B. M. S., was named for ballot at the next meeting, proposed by Dr. Spilsbury and seconded by Mr. Atkinson.

The Council announced, that in consequence of ill-health, Dr. Spilsbury had sent in his resignation of the office of Vice-President.

On the motion of Major Strachey, seconded by Mr. Samuells, the following resolution was passed:—

“That the Society have heard with great regret that the state of Dr. Spilsbury’s health has rendered it necessary that he should withdraw from further active participation in the management of the Society, of which he is one of the oldest and most valued members, and that this resolution be communicated to him by the Secretary.”

The Council applied for a vote for a sum not exceeding 500 Rs., for the printing of Dr. Falconer's Catalogue of the tertiary fossils in the Society's Museum.

Some conversation ensued in reference to the amount of the estimate given by the printer, and the generally high rate charged by the Baptist Mission Press for the printing of the Society's publications. Eventually Dr. Mouat offered to enquire in communication with the Secretary into the comparative charges of other printers in Calcutta, and to report, if authorized to do so, to the Society.

Dr. Mouat's offer was accepted with thanks, and the proposed vote was postponed until his report should have been presented.

The Librarian submitted his usual monthly report.

Major R. Strachey read a paper, being part of a narrative of a "Journey into the Tibetan province of Gugé, on the frontier of Kumaon, and to the sacred lakes of Manasarowar and Raksa Tal."

On the motion of the Chairman, a vote of thanks was given to Major Strachey for his valuable and interesting paper.

The ordinary business being concluded, the meeting was made special for the consideration of Mr. Oldham's proposition, to reduce the rate of the subscriptions of non-resident members.

The Secretary stated that, owing to a mistake which had occurred in the office, non-residents had been allowed to send in their votes up to the 10th instant. He therefore proposed, on the part of the Council, that the special meeting should be continued by adjournment to the first Wednesday in July, to be then held after the business of the ordinary monthly meeting has been disposed of.

Agreed to.

The meeting then separated.

#### LIBRARY.

The Library has received the following accessions during the month of May last.

#### *Presented.*

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Phil.-Histor. Classe. Band XX. heft 2 and 3, Band XXI. heft 1 and 2, 8vo.—BY THE ACADEMY.

————— Mathe-Natur Classe, Band XX. heft 2 and 3, Band XXI. heft 1; 8vo.—BY THE SAME.



Register zu den zweitte 10 Bänden der Sitzungsberichte (Band 11 to 20) der Philos-histor. Classe, der aka &c.—BY THE SAME.

—— ditto ditto Mathe-Natur.—BY THE SAME.

Denkschriften der ditto ditto, Philos-Histor. Band VII. 4to.—BY THE SAME.

Archiv für Kunde österreichischer Geschichts-quellen. Band XVI. heft 2, 8vo.—BY THE SAME.

Fontes Rerum Austriacarum. Ditto ditto Histor. commission. Band XI. abth 2 8vo.

Notizenblatt, Nos. 15 to 24, 1856.—BY THE SAME.

Selections from the Records of the Madras Government, No. XXXIX. —Report upon the Government Central Museums and the Local Museums in the provinces for 1855-56.—BY THE BENGAL GOVERNMENT.

—— ditto of the Government of India (Public Works Department) No. XXII. on Lightning Conductors & Powder Magazine.—BY THE GOVERNMENT OF INDIA.

—— ditto North-Western Provinces Vol. II. on Irrigation, 2 Roads, 3 Bridges, 4 Miscellaneous Works.—BY THE GOVERNMENT OF AGRA.

—— ditto of the Bombay Government No. XII. Sattara Territory. —BY THE GOVERNMENT OF BOMBAY.

Madras Journal of Literature and Science, Vol. I. Nos. 1 and 2, New series.

Vogel's Disorders of the Blood, Translated and edited by Babu Chunder Coomar Dey, 8vo.—BY THE BABU.

Report on the Elliot Marbles in the Madras Museum, *Pamphlet*.—BY THE CURATOR OF THE MUSEUM.

Reports of the Juries of the Madras Exhibition of 1855.—BY THE MADRAS GOVERNMENT.

Report (corrected) of proceedings of a Public Meeting at the Town Hall, Calcutta, in favor of the extension of the jurisdiction of the Mofussil Criminal Courts.—BY THE COMMITTEE APPOINTED BY THE MEETING.

Salámán and Absál, an allegory translated from the Persian of Jámi, by E. Fitzgerald.—BY PROFESSOR E. COWELL.

The Calcutta Christian Observer for May, 1857.—BY THE EDITORS.

The Oriental Christian Spectator for April, 1857.—BY THE EDITOR.

The Oriental Baptist for May, 1857.—BY THE EDITOR.

The Upadeshák for May.—BY THE EDITOR.

A Map of the country between Agra and Umballa with a Sketch of Delhi.—BY MAJOR H. L. THUILLIER.

*Purchased.*

Brande's Manual of Chemistry, 2 Vols. Royal 8vo.

——— Dictionary of Science, Literature, and Art: comprising the history, description, and scientific principles of every branch of human knowledge; with the derivation and definition of all the terms in general use, 8vo. *London*, 1853.

Tomlinson's Cyclopaedia of Arts and Science, 2 Vols., Royal 8vo.

A lecture on Modern Investigations on Ancient India, delivered in Berlin, March 4, 1854. By Professor A. Weber. Translated from the German by F. Metcalfe, *pamphlet*, 25\* copies.

GOUR DA'S BYSA'CK,

1st June, 1857.

*Librarian and Asstt. Secy.*

## LIBRARY.

The Library has received the following accessions during the month of June, 1857.

*Presentations.*

Indische Skizzen. Vier bisher in Zeitschriften zerstreute Vorträge und Abhandlungen. Von A. Weber, Berlin, 1857, 8vo.—BY THE AUTHOR.

A lecture on Modern Investigations on Ancient India, delivered in Berlin, March 4, 1854. By Professor A. Weber. Translated into English by F. Metcalfe.—BY PROFESSOR A. WEBER.

Bijdragen tot de Taal-land-en Volkenkunde von Neêrlandsch Indië. Vierde Deel, Nos. 1, 2, 3 and 4.—BY THE ROYAL INSTITUTE OF NEERLANDSCH INDIE.

Einladung zur Akademischen feier des Geburtsfestes Seiner Majestät des königs Wilhelm von Württemberg. Abhandlung über den Atharva Veda von Dr. Rudolf Roth. *Pamphlet*.—BY THE AUTHOR.

Documents and Facts illustrating the origin of the Mission to Japan, authorized by Government of the United States. May 10, 1851, *Washington* 1857, a pamphlet.

A Catalogue of the Bibliotheca Orientalis Sprengeriana, *Giessen* 1851, *pamphlet*.—BY DR. A. SPRENGER.

Sanskrit-Wörterbuch herausgegeben von der Kaiserlichen Akademie der Wissenschaften. Bearbeitet von Otto Böhtlingk und Rudolph Roth. Zweiter Theil, Bogen 21-30.

\* 24 copies for sale, at 1 R. per copy.

Monatsbericht der Königlichen Preuss Akademie der Wissenschaften zu Berlin. November and December, 1856. *Berlin*, 1857.—BY THE ACADEMY.

The Indian Annals of Medical Science, No. VIII. April 1857.—BY THE EDITOR.

The Physical Geography of Western Tibet, by Capt. H. Strachey. *Pamphlet*.—BY MAJOR R. STRACHEY.

Report of the Director of Public Instruction in the Lower Provinces for the 2d quarter of 1856-57, i. e. from August to October, 1856.—BY THE DIRECTOR.

Selections from the Records of the Bombay Government, No. XLII. Report on Capt. W. L. Merewether with other papers relating to the enlargement of Bigaree Canal in Upper Sind.—BY THE BOMBAY GOVT.

Journal Asiatique, No. 34.—BY THE ASIATIC SOCIETY OF PARIS.

Proceedings of the Royal Society No. 25, Vol. VIII.—BY THE SOCIETY.

Report of the Results of the Administration of Salt Department during 1855-56.—BY THE BENGAL GOVT.

Half yearly Report of the Committee of the Bengal Chamber of Commerce, 30th April, 1857.—BY THE CHAMBER OF COMMERCE.

The Oriental Baptist for June, 1857.—BY THE EDITOR.

The Calcutta Christian Observer for June, 1857.—BY THE EDITORS.

The Oriental Christian Spectator for May, 1857.—BY THE EDITOR.

The Vividhārtha Saṅgraha, Nos. 37 and 38.—BY BABU RAJENDRALAL MITTRA.

*Exchanged.*

The Athenæum, for March and April, 1857.

The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science, Vols. 86 and 87, April and May, 1857.

The Calcutta Review, No. 55 for March, 1857.

*Purchased.*

Literary Gazette, Nos. 2096 to 2104.

Revue des Deux Mondes, for 15th March and 1st April, 1857.

Comptes Rendus, Nos. 8 to 17 ; also Nos. 17 to 19 of 1856.

Mécanique Industrielle, Memoire sur, &c. &c. par M. Seguin Ainé. Paris, *pamphlet*, 1857.

Journal des Savants for March and April, 1857.

The Annals and Magazine of Natural History, Nos. 112 and 113, April and May, 1857.

Annales des Sciences Naturelles, No. 6, Tome V. and No. 1, Tome VI.

Mémoires sur les Contrées Occidentales, traduits du Sanscrit en Chinois, en l'an 648 par Hiouen-Thsang, et du Chinois en Français par M. Stanislas Julien. Tome I. Paris, 1857.

Codices Orientales Bibliothecæ Regiæ Hafniensis, jussu et auspiciis Regiis enumerati et descripti. Paris Tertia, Codices Persicos, Turcicos, Hindustánicos, &c. continens. Hafniæ, pamphlet, 1857.

Revue et Magasin de Zoologie, Nos. 2 and 3 of 1857.

Revue des Deux Mondes, 1st and 15th April, and 1st May, 1857.

The American Journal of Science and Arts, No. 68, March 1857.

The Natural History, Review No. II., April 1857.

The Edinburgh Review, No. 214, April 1857.

The Quarterly Review, No. 202, Ditto.

The Westminster Review, No. 22, April 1857.

GOUR DA'S BYSA'CK,

*Librarian and Asst. Secy.*

### FOR JULY, 1857.

At a Monthly General Meeting of the Asiatic Society held on the 1st instant,

Major R. Strachey, Senior Member present, in the chair.

The proceedings of the last meeting were read and confirmed.

Dr. William Crozier, B. M. S., duly proposed and seconded at the last meeting, was balloted for, and declared elected.

The Council announced that they had appointed Major Strachey a Vice-President in the place of Dr. Spilsbury resigned, subject to the confirmation of the Society.

The report of Dr. Monat on the comparative charges of the printing Presses in Calcutta was taken into consideration; and, after some discussion, a vote was agreed to for a sum not exceeding 500 Rs., as proposed by the Council at the last meeting, for the printing of Dr. Falconer's catalogue of tertiary fossils in the Society's Museum, subject to the condition that the lowest eligible tender be accepted.

*Communications were received—*

1st.—From Bábu Rádhánáth Sikdár, an abstract of the Meteorological Register kept in the Office of the Surveyor General for the month of March last.

2nd.—From Mr. Theobald, Jr., a paper entitled “Notes on the distribution of some of the land and fresh water-shells of India.”

3rd.—From Lt. Raverty, notes on Kokan, Kashgar, Yarkund and other places in Central Asia.

The Librarian and the Zoological Curator submitted their usual monthly reports.

*Special Meeting.*

The ordinary business being concluded, the special meeting, continued by adjournment from 3rd June last, was resumed. A sufficient number of members not being present to decide a question involving an alteration of the rules, a conversation arose as to the proper course to be pursued.

After considerable discussion Major Thuillier moved, seconded by Bábu Rájendralál Mittra—

“That this meeting not consisting of the number of members required by rule 45, the proposal of Mr. Oldham for reducing the subscription of non-resident members cannot be considered, and that the motion be therefore dropped.”

Agreed to.

The proceedings then terminated.

## LIBRARY.

The following accessions have been made to the library during the months of July and August last.

*Presented.*

Sitzungsberichte der kaiserlichen Akademie der Wissenschaften, Philos.-Histor. Classe, Band XXI. heft 3, Band XXII. 1-2.—BY THE PRUSSIAN ACADEMY OF SCIENCES AT WIEN.

————— Math.-Natur. Classe Bánd XXII. heft 1-3, and Band XXIII. heft 1.—BY THE SAME.

Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch. Natur. Classe Band XII.—BY THE SAME.

Archiv für Kunde österr. Geschichtsquellen, Band XVII. heft 1-2, Band XVIII. heft 1.—BY THE SAME.

Fontes Rerum Austriacarum, Band X, Abth. 2, and Band XIII. Abth. 2.—BY THE SAME.

Monumenta Haburgica, 2 Abth.—BY THE SAME.

————— Conciliorum Generalium Seculi Decimi Quinti, Tome I. Royal 4to.—BY THE SAME.

Almanach der kaiserlichen Akademie der Wissenschaften, 1857.—BY THE SAME.

Las Historias Del Origen de los Indios de esta Provincia de Guatemala, Traducidas de la lengua quiche al castellano para mas comodidad de los ministros del s evangelio Por E. R. P. F. F. Ximenez, Por E. Dr. C. Scherzer, 8vo. Vienna, 1857.—BY THE ACADEMY.

The Indian Annals of Medical Sciences or Half-yearly Journal of Practical Medicine and Surgery, No. VIII. April, 1857.—BY THE EDITOR.

Selections from the Records of the Bombay Government, No. XLII.—BY THE BOMBAY GOVERNMENT.

Report on the Survey Operations of the Lower Provinces from 1st Oct. 1855 to 30th Sept. 1856.—BY THE BENGAL GOVT.

Maps of the Administration Report for the year 1855-56, Part III.—BY THE SAME.

The Proceedings of the Royal Society, Vol. VIII. No. 28.—BY THE ROYAL SOCIETY OF LONDON.

The Infant Treatment in Vernacular, 12mo. *Calcutta*, 1857.—BY BABU SHIB CHUNDRA DEB.

Mr. David Smith's Report of the Sigrowlee and Kurhurbaree Coal Fields, pamphlet.—BY THE GOVERNMENT OF INDIA, PUBLIC WORKS DEPARTMENT.

The Oriental Baptist for July and August, 1857.—BY THE EDITOR.

The Calcutta Christian Observer for July and August, 1857.—BY THE EDITORS.

The Oriental Christian Spectator for June and July, 1857.—BY THE EDITOR.

The Vividhárta Saṅgraha, Nos. 37, 38 and 39.—BY BABU RA'JENDRA-LA'L MITTRA.

A letter to the Members of the Photographic Society in Defence of Bábu Rájendralál Mittra.—BY A MEMBER.

Natuurkundig Tijdschrift voor Nederlandsch Indië, Deel XII. Derde Serie Deel II. afl. 4, 5 and 6, and Decl. III. afl. 1 to 4.—BY THE BATAVIAN SOCIETY.

Zeitschrift der deutschen morgenländischen Gesellschaft, Elfter Band, heft 2.—BY THE GERMAN ORIENTAL SOCIETY.



Die Lieder Des Hafis, Persisch mit dem commentare des Sudi Herausgegeben von Hermann Brockhaus, Band I. heft 3 and 4.—BY THE EDITOR.

Deutsches Wörterbuch von Jacob Grimm und Wilhelm Grimm, 2 Band Lieferung 5, Der—Doch. *Liepzig*.—BY THE AUTHORS.

Monographie des Guêpes Sociales, ou de la Tribu des Vespiens, ouvrage faisant suite a la Monographie des Guêpes Solitaires, par Henri de Saussure, Cahier 2nd and 3rd, *pamphlet*, and 1 vol. of plates.—BY THE AUTHOR.

Mélanges Hyménoptérologiques par Henri de Saussure, 1 Fasc. *pamphlet*, 1854.—BY THE AUTHOR.

Nouvelles Considérations sur la nidification des Guêpes par H. de Saussure.—BY THE AUTHOR.

Castréns (M. Alexander) Versuch einer Burjätischen Sprachlehre nebst Kurzem Wörterverzeichnis, Im auftrage der kaiserlichen Akademie der Wissenschaften herausgegeben von Anton Schiefner, *St. Petersburg*, 1857.—BY THE ACADEMY.

The Journal of the Indian Archipelago and Eastern Asia, edited by J. R. Logan, New Series. Vol. I. No. 11, Vol. II. No. 1, 2 copies.—BY THE EDITOR.

Vocabulary of Dialects of Aboriginal Tribes of Tasmania, by Joseph Milligan, No. 7, *sheets*.—BY THE ROYAL SOCIETY OF TASMANIA.

Meteorological Tables kept at the Observatory of Hobart Town, Tasmania, January to May, 1857.—BY THE SAME.

Bhuddhism and Buddhist Pilgrims. A review of M. Stanislas Julien's "Voyages des Pelerins Bouddhistes" together with a letter on the original meaning of Nirvâna" by M. Muller.—BY THE REVIEWER.\*

Annalen der Chemie und Pharmacie. Herausgegeben von F. Wöhler, Justus Liebig und Hermann Kopp, from January to April, 1857.—BY THE CHEMICAL SOCIETY AT LIEPZIG.

Catalogue of the Geological Museum in connexion with the Geological Survey of India, Calcutta, Part I. Minerals, 1857.—BY THE DIRECTOR OF THE GEOLOGICAL SURVEY IN INDIA.

Selections from the Records of the Government of India (Home Department) No. XXIII. Report upon the present condition and future prospects of Tea Cultivation in the North Western Provinces and in the Punjaub.—BY THE GOVT. OF INDIA.

\* Twenty copies for sale at 1 Rupee each.—Apply to the Librarian, Asiatic Society.

*Exchanged.*

The London, Edinburgh and Dublin Philosophical Magazine of Science for May and June, 1857, Nos. 87 and 88.

The Athenæum, for April and May, 1857.

*Purchased.*

Comptes Rendus, Nos. 11 to 21.

Journal des Savants for April and May, 1857.

Revue et Magasin de Zoologie, Nos. 2, 3 and 4 of 1857.

Revue des Deux Mondes, 15th April, 15th May and 1st June, 1857.

The Natural History Review, No. II. for April, 1857.

The Annals and Magazine of Natural History, Nos. 113 and 114 for May and June, 1857.

The American Journal of Science and Arts, Nos. 68 and 69.

Annales des Sciences Naturelles, Tome V. No. 6 and Tome VI. No. 1.

Literary Gazette, Nos. 2105 to 2108.

GOUR DA'S BYSA'CK,

*Librarian and Asst. Secy.*

1st September, 1857.

*Report of Curator, Zoological Department, July Meeting, 1857.*

SIR,—But few donations have been received since my last Report.

1. From T. C. Jerdon, Esq. Nagpore. A small spiny-tailed Swift, the *ACANTHYLIS SYLVATICA*, Tickell, *J. A. S.* XV, 284, obtained by Major S. R. Tickell in Central India, and subsequently in greater abundance near Darjiling. It is well distinguished from the small Pinang species, *Ac. LEUCOPYGIALIS*, nobis, *J. A. S.* XVIII, 809, and structurally by having a more compressed bill, and by having the tail formed as in the large *Ac. NUDIPES* of the Himalāya; whereas the other has the more Woodpecker-like tail of *Ac. GIGANTEA*, with the medial spines much more developed. Both are rare species in collections, if indeed a specimen of either occurs elsewhere than in our own museum.

2.—W. T. Blanford, Esq. A fine specimen of the *RHIZOMYS BADIUS*, Hodgson, or 'Bambu Rat' of the Nipal and Sikhim *tarāi*; also an example of *SUYA ATROGULARIS*, Moore, *P. Z. S.* 1854, p. 77 (a species new to the Society's museum), and a few other bird-skins from the vicinity of Darjiling.

Subsequently, Mr. Blanford has favored us with the following specimens, also from Darjiling.



Of mammalia, RHINOLOPHUS TRAGATUS, Hodgson (very dark-coloured), CORSIRA CAUDATA, (Hodgson,—distinct from *C. ALPINA*—*Sorex alpinus*, Schinz),\* SORICULUS NIGRESCENS, TALPA MICROURA, Hodgson (since set up as a skeleton), specimens in spirit of SCIURUS LOKROIDES and SC. McCLELLANDII, and a skeleton (imperfect) of SCIUROPTERA ALBONIGRA.

Of reptiles, CALOTES (?) TRICARINATUS, MOCOA SIKIMENSIS, CALAMARIA FUSCA, nobis (several, the largest of them 16 in. long), DIPSAS (?) COLUBRINA, n. s., TRIGONOCEPHALUS ——— (P), TR. DIPSAS, var. (anterior half greenish-grey, with black-bordered scales), TRIGONOCEPHALUS NILGIRIENSIS, POLYPEDATES MARMORATA (*J. A. S. XXIV*, 188, of which *Hyla obtusa*, nobis, *J. A. S. XII*, 931, proves to be the young).

3.—From myself. Carcass of a fine male *Sia-gosh* (FELIS CARACAL), which has been prepared as a stuffed specimen.

Lastly, may be noticed a purchased skin, from the neighbourhood of Darjiling, of the remarkably handsome and curiously coloured Bat, NYCTICEJUS ORNATUS, nobis, *J. A. S. XX*, 159, 517, where described from the Khásya hills. The present beautiful specimen had less of the pale colour on the membranes than that originally described; it being confined chiefly to the interfemoral, and to the margin of the fore-arms. Fur of the upper-parts pale fulvous with bright ruddy tips, darker laterally and posteriorly: an interrupted pale median line from the occiput, composed in part of pure white tufts, one at the occiput, another between the shoulders, and a third on the middle of the back; corresponding to these are three white lateral tufts on each side, the first being upon the shoulder: lower-parts subdued white, with a broad dark brown collar or gorget, continued downward as a wide median streak upon the belly; from the shoulders, the white is continued round as a second gorget, interrupted in the middle, but prolonged down each side of the pectoral region, and approximating posteriorly; being bordered outwardly with dark brown at the base of the volar membrane. The pencil, however, is required to aid the pen to convey a vivid idea of the markings of this singularly handsome species, which may well bear the popular designation of 'Harlequin Bat,' a name that should conduce to its facile recognition.

E. BLYTH.

\* Contrary to the opinion of Mr. R. F. Tones, *J. A. S. XXIV*, 362. *N. B.* The small Shrew noticed in *J. A. S. XXIV*, 188, as having been found in a cellar in Madras, I find, from a memorandum, was returned to the Hon'ble W. Elliot, Madras C. S.

## FOR SEPTEMBER, 1857.

The Monthly General Meeting for September was held on the 2nd instant.

Major H. L. Thuillier, Senior member present, in the Chair.

The proceedings of the July meeting were read and confirmed. The August meeting separated without proceeding to business, in consequence of there not being a sufficient number of members present to form a quorum.

*Presentations were received—*

From the Austrian Academy of Sciences at Vienna, the latest publications of the Academy.

Two coins found at Bali, and purchased for the Society's Cabinet, were exhibited. They were, one of Hossein Shah of Bengal, 917 H. and the other of Nuserat Shah, son of Hossein Shah, 930 H.

Robert Schlagintweit, Esq. was proposed as a corresponding member of the Society by the President, seconded by Mr. Atkinson.

Notes from the following gentlemen, announcing their wish to withdraw from the Society, were recorded.

P. W. LeGeyt, Esq., C. S., D. G. Nicholson, Esq. J. F. Curtis, Esq., A. R. Young, Esq., C. S., and W. G. Young, Esq., C. S.

The nomination, which the Council announced in July last, of Lieut.-Col. R. Strachey, as a Vice-President of the Society, in place of Dr. Spilsbury deceased, was confirmed.

*Communications were received—*

1. From Babu Radá Nauth Sikdár, an abstract of the Meteorological Register kept in the Office of the Surveyor General for the months of April, May and June last.

2. From Mr. Piddington, "Notes for Ships and Steamers lying in the stream, or at moorings at Calcutta, or near it, and for River boats, on the approach of a Cyclone.

3. From Ditto "Practical notes on the best mode of obtaining the highest duty from Burdwan Coal as compared with English Coal."

4. From Mr. H. L. Inman, C. E., forwarding an account and diagram of the different deposits passed through in proceeding from the right bank of the Indus to the Coal deposits in the Schware district of Kurrachee.

5. From Major Thuillier, forwarding a paper by Lieut. Montgomerie, Engineers, on the heights of certain snowy peaks of the Himalayah in the neighbourhood of Kashmir.

6. From the Royal Society of Tasmania, the Meteorological tables kept in the Observatory of Hobart Town during the months of January to June last.

7. From the Government of India through Mr. Under Secy. Chapman, copies of papers relative to two Meteoric stones which fell near the Village Parnallee, in the Madura district, Madras:—  
*From R. J. SULLIVAN, Esq.,*

*To H. A. MURRAY, Esq.,*

MY DEAR MR. MURRAY,—I forward herewith a letter from the Revd. J. Taylor, an American Missionary.

Perhaps Lord Harris might wish some steps to be taken about one or both the Aërolite stones mentioned in the letter, the larger one appears a phenomenon in point of size.

Should His Lordship require any one or any portion for the Museum, I can procure it.

(Signed) R. J. SULLIVAN.

*Madura, 28th March, 1857.*

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*From H. S. TAYLOR, Esq.,*

*To R. J. SULLIVAN, Esq.,*

DEAR SIR,—Near the village of Parnallee in this talook two meteoric stones have fallen. I have been on to the ground, and seen the places where they fell and the exact impression made in the earth where they lay. As no rain has fallen since, I was able to see that there was no mistake about it. The noise made as they came through the air made a deep impression on the minds of the people in that region, and was heard, I find from reports, from along the sea shore up to Teruchooly. They fell about three miles apart from each other. The smaller one weighs about 37 pounds, and sunk in the earth, where it fell, two feet and eight inches. The

larger one is from three to four times as large, and sunk in the earth two feet and four inches. It struck the earth flatwise. The smaller one fell about perpendicularly. The larger fell (coming from the north a little to the west) making an angle with a perpendicular line, of about fifteen degrees. Persons were standing near each place where they fell. Many worshipped them. The villagers gave them up to me, on condition that I should inform you, and save them from trouble being made, or rather, which they feared some officials might make. I do not make this statement officially, but am ready, if you desire it, to make an official statement on the subject. In writing this, I have fulfilled my promise to the people there.

Yours affectionately,

(Signed) H. S. TAYLOR.

*Mandahasolie, March 28th, 1857.*

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*From H. A. MURRAY, Esq.,*

*To R. J. SULLIVAN, Esq.,*

MY DEAR SULLIVAN,—I write to acknowledge the receipt of your letter of the 28th ultimo, with enclosure from the Rev. Mr. Taylor (herewith returned), and to thank you for the information which you afford.

Lord Harris desires me to say that he thinks one of the meteoric stones, the larger one, should certainly be sent to the Museum here, and that Mr. Taylor might keep the other one for himself, as he might perhaps like to do so; and to request at the same time also, that you would ask Mr. Taylor to be good enough to furnish you with a statement of all the particulars and circumstances connected with the occurrence, the state of the atmosphere at the time, &c.

(Signed) H. A. MURRAY.

*Guendy, 1st April, 1857.*

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*From H. S. TAYLOR, Esq.,*

*To R. J. SULLIVAN, Esq., Collector of Mudura,*

DEAR SIR,—Your note of 9th of April reached me at Rumnad on the 22nd, also the note of Mr. Murray to yourself, which I here-

with return. I agree with Lord Harris that "one of the meteoric stones" should be sent to the Museum at Madras, and I consent that it should be the largest, as they fell within this Presidency. I also thank His Lordship for kindly suggesting to you that "Mr. Taylor might keep the other one for himself as he might perhaps like to do so." Simply for myself I do not desire it, but while I honor the English, and am glad to have one at Madras for that reason, I love also my own country, which is but a branch of the English stock, and wish to send the other there. You are at liberty, however, to keep it at Madura till after the Exhibition in June.

In respect to Mr. Murray's request through you, I would state that I gave a somewhat minute account of their fall, &c. to Dr. Colebrook, with liberty to publish, should he think best, in the *Athenæum*. If he has done so, this may not be needed; I will, however, give a few particulars.

1. They fell on the 28th of February, Saturday, at about noon, a little south east of the village of Parnallee, Latitude north, according to the Government Map  $9^{\circ} 14'$  Longitude  $78^{\circ} 21'$  east.

2. The largest one fell a few seconds before the smaller one, and from two to three miles north of it. As was manifest from the hole it made in the ground when it fell, it came from a direction some ten degrees west of north, making an angle of about 15 or 20 degrees with a line perpendicular to the earth's surface. It struck the earth (or at least lay in the bottom of the hole made by it) flatwise, on the side that is most convex. The most round or convex side of the smaller stone also was downward, this being the position they would naturally assume as they passed with great velocity through the resisting atmosphere, an idea which did not occur to me till now. I had before simply noted the fact. The larger stone sunk into the earth when it fell, two feet and five inches, in a perpendicular direction. The smaller one two feet and eight inches. The smaller one fell also about perpendicularly. The smaller does not appear in any respect like a fragment of the larger one. The specific gravity of the smaller one, when it fell was about 3.3, water being the standard of unity. I observed that the specific gravity was increased after exposure to a shower, or that of the smaller



one was. I did not try that of the larger. The crack on the convex side of the larger one I did not perceive at all till it had been wet, and then at first it was just perceptible. Afterwards it gradually opened, I suppose, owing to the oxidation of the native iron it contains, perhaps, however, to other causes. The stones had not been wet till they came into my hands April 21st. They, each of them, fell in cultivated fields, one of which had been harvested. The crop in the other was still standing.

3. The *noise* seems to have been terrific to the Natives, causing those near to crouch from fear. It came like two claps of thunder, as they fell one after the other, continuing for some time, but gradually growing less loud. As they fell through the whole depth of our atmosphere, this would naturally be the case. The noise appears to have been heard at *Tuticorin*, forty miles distant. At this place, sixteen miles north, it excited considerable interest among those abroad at the time. The noise must have been great, occasioned by their great velocity. Taking their specific gravity into the account, say 3-3, their size being about that of large cannon balls, some allowance also being made for their irregular shape, from the depth they penetrated the soil, which was of common hardness, those who have observed the power of projectiles in such cases, will be able to calculate approximately what that velocity was.

4. Of the excitement among the natives, I suppose, I need not speak. I visited the place, because of the rumours that were flying abroad, making it evident to my mind that something peculiar had there transpired. First, I saw the holes from which, in the cultivated fields they had been freshly taken, no rain having subsequently fallen, and saw at the bottom the *hardly compressed* and exact impression left by them as they were taken up, and then as I saw the stones, I knew instantly that they were the identical ones which had been taken from those places. As I was more or less known in that region, and there is no gentleman whatever anywhere near, the rural people, utterly ignorant of the cause, came in great numbers to state the facts, and ask some explanation. Some of them supposed they were gods that had fallen; some that they had been shot from cannon in ships at Tuticorin; and some, that a Brahman

had brought them from the sea by his muntrunes: some rejected all these theories; but no one could tell or feel satisfied as to how these things could be. By simply striking my staff through the air, I could explain to them the noise; and by tying a stone to a string, and swinging it I could make them understand the centrifugal and centripetal forces, and how that from some disturbance in these forces, stones moving about some centre, like the moon about the earth, might fall. The explanations gave them relief. They put confidence in me, and gave me the stones at my request, that I might save them from the trouble of any official investigation, and put them into some Museum, or Scientific Institution.

P. S.—I forgot to say that there was nothing peculiar in the state of the atmosphere. It was a clear day. When the stone is sent on to Madras, if any scientific gentleman makes an analysis of it for the Museum, please be so good as to ask a copy of it for me.

Yours very truly,  
(Signed) H. S. TAYLOR.

*Mandukhasolie, April 25th, 1857.*

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8. From Mr. E. Lushington, Officiating Assistant Secretary to the Government of Bengal, inclosing copy of a despatch, dated 3rd June last, from the Hon'ble Court of Directors, and enclosure on the subject of the Geological Map of India prepared by the late Mr. Greenough:—

*From R. B. CHAPMAN, Esq.,*

*Offg. Under-Secy. to the Govt. of India,*

*To A. R. YOUNG, Esq.,*

*Secy. to the Govt. of Bengal.*

*Dated the 27th July, 1857, Home Department.*

SIR,—With reference to the special Narrative of the Government of Bengal, No. 25, dated the 25th August, 1856, respecting Mr. Greenough's Geological Map of India, I am directed to transmit for the information of the Hon'ble the Lieut.-Governor, and for communication to the Asiatic Society, the

accompanying copy of a despatch, No. 76 of 1857, dated the 3rd June, from the Hon'ble the Court of Directors and enclosure.

A copy of the despatch has this day been communicated to the Superintendent of the Geological Survey for information, and for such remarks as he may be disposed to offer thereon.

I have, &c.,

(Signed) R. B. CHAPMAN,

*Offg. Under-Secy. to the Govt. of India.*

### *Public Department.*

Our Governor-General of India in Council.

Para. 1.—We observe that all the Officers, to whom the Map was communicated, expressed a high

Letter dated 4th Sept. (No. 117) 1856, forwarding Bengal special narrative relating to the Geol. Map of India, prepared by the late Mr. Greenough, and sent out by the Court for examination, and remarks by the officers of Government in India.

sense of its value, as a record of existing information as to the Geology of India. But it appears to be considered by a Committee of the Asiatic Society of Bengal, that from various circumstances the map should remain unaltered, as a memorial

of the state of our Geological knowledge at the time of its publication, and that any Geological Map of India, intended to shew the results of more recent and more extended investigations, should be commenced *de novo*, when sufficient data shall have been obtained from the researches now in progress.

2. We transmitted the correspondence on the subject to the Council of the Geological Society of London, with a request that we might be furnished with the opinion of the Council on the best mode of proceeding, with a view to the framing of an accurate Geological Map of India.

3. We now forward to you in the packet a copy of the letter in which the views of the Council are stated, from which you will observe that the Council concurs generally in the conclusions of the Committee of the Asiatic Society of Bengal.

4. The various suggestions of the Council seem worthy of adoption, and we do not doubt that, in communication with Mr. Oldham,



you will be able to frame a scheme, by which the object in view will, in proportion as a correct knowledge of the Geology of India is obtained, be effectively carried out.

We are, &c.,

(Signed) ROSS D. MANGLES,

„ F. CURRIE,

*And other Directors,*

*London, 3rd June, 1857.*

*Dover, 7th March.*

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TO SIR J. C. MELVILL, K. C. B.,

*Secretary to the Hon'ble East India Company.*

SIR,—The Council of the Geological Society having carefully examined the documents submitted for their consideration by the Court of Directors of the East India Company, in reference to the Geological Map of India, compiled by the late Mr. Greenough, have requested me to convey to the Court of Directors their opinion on the subject as requested by your letter of the 5th Jannary.

It appears from the reports of the Indian authorities to whom the Map has been forwarded, that in respect to topography it is extremely defective, and on that ground alone the Council would consider it an unfit basis for accurate Geological investigations, such as those now carrying on under the sanction of the East India Company.

It is surmised in one of the reports that the inferiority of the Map in this point of view may be partly ascribed to the long period of labour (20 years) bestowed upon it, the topographical Map having perhaps been selected at the remoter epoch of this long period of time, but knowing the extraordinary zeal with which Mr. Greenough pursued Geographical enquiry, sparing neither time, labour, nor expense, the Council cannot imagine that he neglected any means within his reach to give perfection to his Map, and are therefore more disposed to the conclusion that the materials for a good Map of India are more abundant and accessible in India than in England. The fact, however, is the same, and the Council cannot therefore recommend any further extension of the Map by

the issue of a new edition, thinking it best that the existing and unappropriated copies of the Map should be so distributed in India as to facilitate the comparison of its results with those of recent observation, the Map containing therefore a record only of the information accumulated by Mr. Greenough.

The necessity of adopting this course is further confirmed by the very strong opinions expressed by the Director of the India Geological Survey and by the Curator of the Museum of Economic Geology in India, of the many inaccuracies in the Geological information of the Map, inaccuracies not confined to errors in determining the limiting boundary between two contiguous formations, but involving the most serious mistakes as to the true nature and position of the formations themselves. These mistakes it was scarcely possible that Mr. Greenough as the compiler of the information, obtained by others, of whose ability and accuracy he could not always be a competent judge, should entirely avoid; but it would be very unwise to hamper the able Geological Surveyors of India by requiring them to adjust their information to so imperfect a Map. The opinion of the Council is therefore that the first step should be, to lay down from all the information possessed in India, an approximatively correct topographical Map, which it is believed could be effectively done by the East India Survey Department, and that on this Map should be recorded all the information of a Geological character in possession of the Directors, whether in India or at home, the act of recording being, however, confided to the Geological Department in India, as best able to estimate the fidelity and value of the information not actually resulting from their own enquiries.

The Council would also suggest that copies of this improved Map should, as soon as possible, be forwarded to the learned Societies, especially Geological, at home, in order that the attention of scientific men should be at the first moment directed to it, as one of the best means of insuring its ultimate perfection.

I have, &c.,

(Signed) J. G. PORTLOCK, *President.*

The Librarian submitted his usual monthly report for the months of July and August last.

## LIBRARY.

The Library received the following accessions during September last.

*Presented.*

Annalen der Chemie und Pharmacie for May, 1857.—BY THE EDITOR.

Journal Asiatique, No. 35.—BY THE ASIATIC SOCIETY OF PARIS.

Journal of the Statistical Society of London, Vol. XX. Part II. June, 1857.—BY THE SOCIETY.

——— (Quarterly) of the Geological Society, No. 50, Vol. XIII. Part. 2, May, 1857.—BY THE SOCIETY.

Weber's (Dr. A.) Indische Studien, Band IV. Heft 1.—BY THE AUTHOR.

Introduction a L'Etude de la Langue Japonaise, par L. Léon De Rosny. —BY M. CHEZ BENJAMIN DUPRAT.

Journal of the Academy of Natural Sciences of Philadelphia, New Series, Vol. III. Part I. *Philadelphia*, Royal 4to.—BY THE ACADEMY.

Geological Papers on Western India, including Cutch, Sind, and the South-east Coast of Arabia; to which is appended a Summary of the Geology of India generally edited for the Government by H. J. Carter, Royal 8vo.; with an Atlas of Maps and Plates, folio.—BY THE GOVT. OF BOMBAY.

Smithsonian Contributions to Knowledge, Vols. VI. and VII. Royal 4to. *Washington*.—BY THE SMITHSONIAN INSTITUTION.

——— Reports 8th and 9th (Annual) and the Proceedings of the Board of Regents of the Institution, up to Feby. 4th, 1855.—BY THE SAME.

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. VII. Nos. 2 to 7 (sheets).—BY THE ACADEMY.

——— of the New Orleans Academy of Sciences, Vol. I. No. 1.—BY THE ACADEMY.

Constitution and By-laws of the ditto.—BY THE SAME

Madras Journal of Literature and Science, April to June, 1857, Vol. II. and No. 3.—BY THE EDITOR.

Selections from the Records of the Government of Bengal. No. XXVI. Reports on the Suppression of Dacoity in Bengal for 1855-56, 2 copies.—BY THE BENGAL GOVT.

Vikramorvas'ī of Kālidāsa translated into Bengali by Kaliprasana Sing, *pamphlet*, Calcutta, 1857.—BY THE TRANSLATOR.

Bistvādīstāk, by Bharut Chunder Seeromonce, *pamphlet*, Calcutta, 1268.—BY BABU GOUR DA'S BYSACK.

The Vividhārtha Saṅgraha, No. 40.—BY BABU RAJENDRALAL MITTRA.

The Oriental Christian Spectator for August, 1857 —BY THE EDITOR.

The Oriental Baptist for September, 1857.—BY THE EDITOR.

The Calcutta Christian Observer for ditto.—BY THE EDITORS.

*Exchanged.*

The Athenæum, for June, 1857.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 89 and 90, for July, 1857.

*Purchased.*

Annales des Sciences Naturelles, Tome 6, Nos. 3 and 4.

The Annals and Magazine of Natural History, No. 115, for July, 1857.

Comptes Rendus, Nos. 22 and 23.

Tables des Comptes Rendus des Sciences de l'Academie des Sciences, Tome quarante-Troisiem, July to December, 1856, Tome XLIII.

Literary Gazette, Nos. 2109 to 2112.

The Natural History Review, No. 3, for July, 1857.

Revue des Deux Mondes, 15th June and 1st July, 1857.

Revue et Magasin de Zoologie, No. 5, 1857.

Edinburgh Review, No. 215, for July, 1857.

Westminster Review, No. XXIII. July, 1857.

Weber's (Dr. A.) Indische Studien 4th, Band X. Heft 1.

Traces de Buddhisme en Norvège avant l'introduction du Christianisme, par M. C. A. Holmboe, 1857, pamphlet.

Études sur la Grammaire Védique. Praticākhyā du Rig-Véda par M. A. D. Regnier, 8vo. *Paris*, 1857.

GOUR DA'S BYSA'CK.

*Librarian and Asst. Secy.*

1st October, 1857.

FOR OCTOBER, 1857.

The Monthly General Meeting for October was held on the 7th Instant.

The Hon'ble Sir James Colville, *Knight, President*, in the Chair.

The proceedings of the last Meeting were read and confirmed.

Presentations were received—

1. From C. G. F. Lloyd, Esq., New Norfolk, Tasmania, a box containing animals and birds as described in Mr. Blyth's report.

2. From the Smithsonian Institution, Washington, the latest publications of the Institution.

3. From the Government of Bombay, 2 copies of the Geological papers on Western India, &c., with Atlas.

4. From Babu Kali Prasana Sing, a copy of his translation of Kalidass's *Vikramarvasi*, a pamphlet.

The election of Mr. Robert Schlagintweit as a corresponding member of the Society was postponed under rule 6 of the Society's byelaws.

The following gentlemen have signified their wish to withdraw from the Society. Their notes were recorded.

Lieut. H. T. FORBES,

Dr. F. J. MOUAT.

The Council announced that they had elected, as members of their body, subject to the confirmation of the Society, Captain C. H. Dickens, and Mr. Cowell in the place of Dr. Spilsbury deceased and Archdeacon Pratt resigned.

*Communications received.*

1. From Mr. H. Piddington a description of the "Balsa" or raft of the Phillipine Island, with directions for making it.

2. From Lieut.-Colonel Waugh, Surveyor General of India, through Major Thuillier, the following papers on the identity of Mount Everest with Deodangha.

SURVEYOR GENERAL'S FIELD OFFICE,

*Deyra Dhoon, 5th August, 1857.*

MY DEAR THUILLIER,—In my letter No. 29 of 1st March, 1856, communicating the results of our calculations for the position and height of No. XV in my list of Himalayan peaks, I stated my reasons for deciding to call this peak "Mount Everest."

At the August meeting, last year, of the Asiatic Society of Bengal, you were good enough to communicate the results regarding "Mount Everest" in an interesting address delivered by yourself. The facts having been thus promulgated, Mr. Hodgson endeavoured in the *Journal of the Asiatic Society* to establish the identity of Mount Everest with Deodangha, &c. The arguments adduced for this purpose were so palpably conjectural, resting on hearsay evidence alone, that I thought it needless to refute them, as their fallacious character must be apparent to any person competent to understand

the subject. The true Geographical Latitude and Longitude of Deodangha are unknown to Mr. Hodgson, or even its true bearing and distance from any locality which can be recognised as a fixed point of departure. Its height also is unknown. All these data are elements necessary to the identification of that mountain. The physiognomical contour of a mountain is a very uncertain test, because it changes with every mutation of aspect; but even this test is wanting in Mr. Hodgson's case, as he has never seen Deodangha.

In April last, my attention was drawn to another communication made by Mr. Hodgson to the Asiatic Society, from which it appears that he has taken steps to put the subject, in what appears to me, a very unfair light, before the Royal Asiatic Society, as well as to have his conclusions on a point of great ambiguity, promulgated as certainties in Journals of extensive circulation. Under these circumstances, I considered that it would be satisfactory to scientific men, that the grounds on which the supposed identity of Deodangha was made to rest, should be examined and discussed. In my judgment the only proper way of doing this, was to lay the whole of the documentary materials before a Geographical Committee composed of Geometricians of experience and capacity, competent to deal with such investigations. With this view I issued departmental orders annexed.

Of the five officers to whom this duty was assigned, four have now delivered their reports. The fifth Lieut. Montgomerie of Engineers is at present difficult to communicate with, being absent in Thibet, conducting the G. T. Survey operations beyond Kashmir. That officer's opinions will be very valuable, and D. V. shall be transmitted hereafter. In the meantime, encompassed as we are by the confusion and embarrassments attending a military rebellion of unprecedented magnitude, I am unwilling to delay the transmission of the four reports hereto annexed. These are so ably argued, and place the subject in so luminous a point of view, that it is unnecessary for me to add more than a few words in this place.

Mr. Hodgson labours under a strong conviction, that Mount Everest is identical with Deodangha; and the enthusiasm and ingenuity with which he advocates his view of the question seem to have carried the same conviction to the minds of others not conver-



sant with the facts. It is easy to see how, this fallacy originated in his mind. The sketch map published by him in the *Journal of the Asiatic Society*, December 1848, gives his idea of the configuration of that part of the Himalayas. A more erroneous impression of the formation of the country was never formed. He represents a solitary mountain occupying a vast tract. If this unity really existed, the identity of Mount Everest and Deodangha would indeed be indisputable, as it would rest on the fact of there being only one mountain within a given space. This single mountain, however, is entirely imaginary. The range presents the appearance of a sierra with innumerable peaks and groups of peaks. Among these, nine have been fixed by the G. T. Survey of India, and are marked XII to XXI in the chart accompanying Mr. Scott's report. Besides these nine, several others are more or less partially visible, which we were unable to identify, and those who have any experience in conducting Geodetical operations in the Himalaya, can harbour no doubt that many other peaks do exist, which have been concealed from our view by intermediate ranges. It is well known to Surveyors, that among a number of peaks having various altitudes and distances, the highest point in appearance is not always the highest in reality; the ocular deception being caused by the increment in the earth's curvature and decrement in the subtended angle caused by distance.

The erroneous idea Mr. Hodgson has formed of the configuration of this mountain range is sufficiently proved by his sketch map already referred to. If further proof was necessary it may be derived from the statement Mr. Hodgson has given of the opinion he communicated to me when I returned from the expedition I made into Sikim in 1847. Having mentioned to him, that I had seen from the confines of that province an enormous snow mass lying in a north-westerly direction from Tonglo, he immediately pronounced it to be "Deodangha." Now the mountain I then saw was not Mount Everest, but No. XIII which Major Sherwill has so well described in the *Asiatic Journal*. Thus Mr. H. has attributed the same name to No. XIII and to No. XV without any exact knowledge of the height or position of either. He has fallen into this mistake from adopting the erroneous conception that there is only a single mountain in all this wide space.

Mr. Hodgson proves no more than that there is according to native report, a mountain called Deodangha somewhere between our Nos. XI and XXI (vide chart.) That mountain may be one of the peaks fixed by us, or it may be one that we failed to fix, or it may not have been visible to us at all.

If Deodangha is to be taken as the highest peak, that allegation only rests on the hearsay evidence of natives unable to determine the actual height of a mountain, and if it be a true guess on their part, it by no means establishes the identity of Deodangha, because we do not know for certain that Mount Everest is the highest culminating point. All we do know is, that it is the highest point we have measured.

The only satisfactory way, in which the position of Deodangha can be determined, is by carrying a series of triangles towards it, until it can be seen and identified. Operations of this kind are impracticable at present for political reasons. In the meantime the position and height of Deodangha constitute a Geographical problem remaining to be solved. If it is not identical with Mount Everest, a very grave blunder would be committed by assigning its name to another peak. If it is identical, no harm will have been done by the adoption of another cognomen, pending the doubt now existing.

Great stress has been laid in some quarters on the fact, that the position of Deodangha is given in German maps. Now this proves no more than that some German Geographers are rash enough to lay down any thing upon hearsay, for we know beyond all question, that no competent European, with adequate means, has ever been in the vicinity of Deodangha, so as to be able to fix it. Deodangha does not appear in English maps, because it would be inconsistent with the rigorous notions which prevail among English scientific men in general, to pretend to give the position of a point on the earth's surface on hearsay evidence. It would violate every principle of accuracy and precision laid down by my predecessor for the conduct of the Trigonometrical Survey of India to jump at conclusions, in this reckless manner.

As the principle of adopting an European name has been much commented upon, I will here add without further remark, paras. 6 and 7 of my letter to your address, cited at the commencement of his letter.



"I was taught by my respected chief and predecessor Colonel G. Everest, to assign to every Geographical object its true local or native appellation, and I have always scrupulously adhered to this rule, as I have, in fact, to all other principles laid down by that eminent Geodist.

"But here is a mountain, most probably the highest in the world, without any local name that we can discover, whose native appellation, if it has any, will not very likely be ascertained until we are allowed to penetrate into Nepal."

In conclusion, as the Asiatic Society has inserted in its Journal papers tending to mislead in regard to the identity of Deodangha and Mount Everest, I trust that they will give prominence to this discussion, which proves that the identity is not only doubtful, but far from probable, if the particulars supplied by Mr. Hodgson are correct so far as they go. Considering it a matter of importance, that Geographers should be enabled to form their own opinion on the subject, I request you will communicate this correspondence with its annexures to the Asiatic Society retaining a copy for record.

I remain, &c.

(Signed) A. S. WAUGH.

P. S.—You will perceive the gist of the question is not whether the mountain should be called Mount Everest, or by its true native name (which is a principle not disputed by any one), but whether it can be called Deodangha without risk of error, in the absence of satisfactory proof that this is really its native name.

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*Department Order.*

*Surveyor General's Field Office,*

*Dhera Dhoon, 22d April, 1857.*

The attention of the Surveyor General of India having been drawn to the proceedings of the Asiatic Society, as marginally cited, it appears to him desirable that the question, which has been raised as respects the identity of Mount Everest "with Deodangha," should be examined by

From Mr. Hodgson submitting for the information of the Society, and the public in general, the following extract of a letter from the Secretary to the Royal Asiatic Society in reference to the mountain Deodangha ("Mount Everest" of Waugh.)

Your letter of the 27th October, together with your observation on the

incongruity of assigning a European name to Indian localities, already provided with native appellations, was received and read at our last meeting of the 17th inst., and I have the pleasure to inform you, that the members present unanimously expressed their concurrence with your view of the case.

A notice of the paper was communicated to the *Athenæum* and *Literary Gazette*, and has appeared already in full in the latter journal.

I have, &c.,  
(Signed) E. NORRIS,  
Secy. R. A. Society.

To B. H. HODGSON, Esq.

a competent Geographical Committee, in order to set that point at rest.

2. The Surveyor General has carefully examined all that Mr. B. H. Hodgson has advanced in support of the identity of Mount Everest with Deodangha, and has formed his own opinion on the subject; but he thinks it will be desirable that the ques-

tion should also be formally investigated by a Committee, and the opinion thereof placed on record for general satisfaction.

3. The Committee will be composed as follows:—

Lieutenant Tennant, Eng., 1st Assistant G. T. S., in charge of Jogi Tila Series.

W. Scott, Esq., Chief Draftsman in the Field Surveyor General's Office.

J. W. Armstrong, Esq., Civil Assistant G. T. Survey.

Lieutenant Montgomerie, Eng., 1st Assistant G. T. Survey, in charge of Kashmir Series.

J. Hennessy, Esq., 2d Assistant in charge of Geodetic Computations at Trigl. Survey Head Quarters.

4. The papers connected with Mount Everest, and Mr. Hodgson's alleged identification thereof with Deodangha, are at present under charge of Mr. W. Scott who has spent a quarter of a century in unravelling more intricate geographical problems than this. Mr. Scott will form his own independent opinion, and submit the same to the Surveyor General, after which he will forward the papers to Mr. Hennessy.

5. Mr. Hennessy has been engaged on all the computations for determining the positions and heights of the principal peaks of the Himalaya Range, including Mount Everest, and is well acquainted with investigations of this kind. He also saw Mount Everest when he was engaged in the North East Longitudinal Series. After submitting his independent opinion to the Surveyor General, he will forward the papers to Mr. J. W. Armstrong.





6. Mr. Armstrong is one of the gentlemen by whom Mount Everest was observed. He will forward his opinion to the Surveyor General, and the papers to Lieutenant Tennant, by whom they will be independently reviewed; thus giving the investigation the benefit of his eminent abilities in matters of difficult research.

7. From Lieutenant Tennant, the papers will proceed to Lieutenant Montgomerie in Kashmir, whose recent experience in details of Himalayan Geography will enable him to pronounce this question, a valuable independent opinion, which he will transmit with all the papers to the Surveyor General.

(Signed) A. S. WAUGH,  
Surveyor General of India.

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*Memo. by Mr. W. H. Scott, Draftsman in the Field Surveyor General's Office.*

With reference to Department Orders No. 10267, dated 22nd April, 1857, in which I am called upon to state my independent opinion on the identity of Mount Everest with Deodangha or Bhairavathan, I beg leave to report for the information of the Surveyor General of India as follows:—

After a very careful examination of the papers specified in the margin, I am humbly of opinion

1st. Mr. Hodgson's letter on the Native Name of Mount Everest, J. A. S. No. 5, 1856.

The papers referred to in that communication and published in J. A. S. No. 6, 1856 are,—

1st. Routes of two Nepaulese Embassies to Pekin, with remarks on the Watershed and Plateau of Tibet.

2nd. Systematic summary of the route from Katmandu to Pekin, Kaji Dalbhanjan Pande, 1822-23.

3rd. Abstract of Diary from Katmandu to Pekin by Chountra Pushkersah, 1817.

4th. Memo. on the Seven Cosis with Sketch Map, J. A. S. December 1818.

that there is no evidence to establish satisfactorily the identity of Mount Everest with Deodangha or Bhairavathan.

The routes of the two Nepaulese Embassies from Katmandu to Pekin no doubt contain much interesting details, but unfortunately they do not assist us in the present investigation, because, the Azimuths or Bearings, it will be seen, are not given,

and consequently we can bring them to no account. It is essentially necessary that the position of Kutighat or Bhairava Langur should be known with some degree of certainty, but this we are unable to do



by the aid of the papers in question, as will be apparent to all familiar with the subject. All the maps I have consulted only tend, in my humble opinion, to confuse and mislead; for instance, the direct distance of Kuti from Katmandu, according to Kirkpatrick's Map, is only 48 miles N. 88° E.; Walker's engraved Map gives 63.6 miles N. 60° E.; Parbury and Allen's 60 miles N. 55° E.; according to Crawford, 75 miles N. 75° E.; Arrowsmith's Map 56.6 miles N. 78° E.; according to the Preliminary Sketch Map compiled at the Surveyor General's Office, Calcutta, 72.6 miles N. 53° E.; according to the route of Kaji Dalbhanjan Pande, the distance is 101.5 miles. The Chountra omits Kuti altogether.

Amidst these conflicting values it is of course impossible to arrive at any satisfactory conclusion. The following extract from a letter from Major Ramsay, Resident at Nepal, to Major Thuillier, regarding the compilation Map of that country, dated 11th June, 1855, will serve to convey an idea of the conjectural materials and discordant elements we have to deal with. "You are doubtless aware that no European has ever travelled in the interior of this country, and that all the information we possess of it, is derived from the reports of persons who are totally devoid of scientific knowledge, and accustomed in their comparisons of distances to trust to vague estimates formed by parties who have travelled through the different districts."

With respect to the sketch map it will be seen, that Mr. Hodgson gives only one isolated peak segregated from all the rest; whereas nothing can be more contrary to the fact as regards the Himalayas. Besides the configuration of the ground must be very different to that represented by Mr. Hodgson, being in fact difficult in the extreme. There is, however, no evidence to shew that Mount Everest and Deodangha are identical. Mr. Hodgson says, "The Bhootia Cosi has its source at Deodangha, a vast Himalayan peak situated some sixty or seventy miles east of Gosainthan, and *a little north and east of the Kuti Pass, being probably the nameless Peak*,\* which Colonel Waugh conjectures may rival Kanchanjunga in height. The river flows from the base of Deodangha past the town of Kuti, and

\* The words underlined by me are omitted in Mr. Hodgson's communication on the native name of Mount Everest. J. A. S. No. V. 1856.

has a S. W. direction from Kuti to Dallalghat." Vide Memo. on the seven Cosis.

Now, on comparing Mr. Hodgson's sketch with the accompanying chart which exhibits all our peaks laid down between Katmandu and Darjiling, it will be seen that it is not likely the Bhootia Cosi could have its sources at our Mount Everest, because it appears to me, as far as I can judge, that the Dud Cosi, which rises "amid the perpetual snows," and also the Arun Cosi, would be to the left and right of Mount Everest respectively, so that it does not seem clear how the Bhootia Cosi, can originate from our Mount Everest.

Again Mr. Hodgson says, "This great mass is visible alike from the confines of Nepal Proper, (the valley,) and from those of Sikkim, and all the more unmistakeably, because it has no competitor for notice in the whole intervening space. It is precisely half way between Gosainthan which overlooks Nepal Proper, and Kanchang which overlooks Sikkim." Now a slight computation will serve to shew that Mount Everest is invisible from the valley, being depressed nearly one minute and thirty seconds below XVIII. The most conspicuous mass visible from Katmandu or the valley would be our Peaks XIX. and XX. Nor is Mount Everest visible from the confines of Sikkim, as Major Sherwill did not see it anywhere on his route from Singelelah to Kanglanamo, the height of the latter place, Major Sherwill estimates to be 13,000 feet. He says, "One Mountain in the Nepal range is a most remarkable object, both for its curious shape and for its immense height, its name none of my party knew, nor have I yet succeeded in obtaining the name. The Peak is a hollow crater-like mountain, probably 27,000 feet in height with a long table mountain attached to it, both covered with glaciers. To the west of this great mountain are five distinct Peaks separating the large mountain from a hollow shell-like and perpendicular mountain about 26,000 feet in height." (Notes upon a tour in the Sikkim Himalaya mountains. J. A. S., No. VIII. 1853.) The mountain here alluded to is our XIII., the height of which is 27,779 feet, Mount Everest being depressed nearly 14 minutes below XIII.

From the foregoing I am led to infer, that Mr. Hodgson has



probably mistaken one peak for another, more especially since the country is said to be very polyglottic; in fact, Mr. Hodgson himself throws some doubt on the identity of Mount Everest with Deodangha, or Bhairavathan, or Bhairava Langur, or Gnalham thangla, as his own expression "being *probably* the nameless peak which Colonel Waugh conjectures may rival Kanchanjunga in height," evidently shews. The following extract from an interesting account of the ascent of the mountain Sumern Purbat by Captain Robertson, given in the Report of the British Association for the advancement of science for 1855, will serve to shew how liable we are to fall into mistakes in identifying a group of peaks even when in their immediate neighbourhood. "On the right of the Glacier rose the three Great Jumnotri Peaks, designated in sheet 65 of the Trigonometrical Survey of India, Black E., Great E., and Little E., the altitudes of which, as given in the map, are 21,155, 20,916, and 20,122 feet. The peaks designated in the Trigonometrical Survey, Great E. and Little E. are the two summits of a mountain which the natives call Bunderpanch. On the left the Glacier was bounded by a wall of precipices terminating in the lofty snow-covered Peak of Sumeru Purbat. The height of this peak is not given in the Survey Map, but from its appearance, as compared with that of the measured peaks, and also from the height it rises above the limits of perpetual snow, I should estimate its altitude at about 18,000 feet. The altitude of Bunderpanch-ke-ghattee, I estimate at about 16,000 feet.

"In making my agreement with the Brahmin, I was under the impression that Sumern Purbat was one of the measured peaks, and it was not until I reached Bunderpanch-ke-ghatta that I discovered my mistake."

(Signed) W. H. SCOTT,  
*Draftsman, S. G. Field Office.*

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*Memorandum by J. Hennessy, Esq., 2nd Assistant in charge of the Geodetic computation at Trigonometrical Survey Head Quarters.*

I have carefully perused Mr. B. H. Hodgson's paper, attempting to identify Mount Everest with some hill variously called "Devadangha, vel Bhairavathan, vel Bhairava-langur, vel Gnalham thangla."

I am of opinion that Mr. Hodgson has advanced no evidence whatever to prove this identity.

The arguments stated, if indicating any one peak more than another, point to Peak XVIII., as the one called Devadhangha, &c.

Thus Mr. Hodgson speaking of Devadhangha says—

It is a “great mass.”

It is visible “from the confines of Nepal (proper.)”

Now the straight line passing through Mount Everest and XVIII., and extended towards Nepal Proper passes nearly through the centre of that valley, nor is there any point in the latter at which the angle Mount Everest and XVIII. exceeds  $3^{\circ}$ ——. Taking any point on the straight line Mount Everest, XVIII., and valley, and within the valley, the latter peak shuts out the former, as can be demonstrated by calculation. It is also exceedingly improbable that the same does not occur from *any* point whatever in the valley. But be this as it may, it is impossible, under the circumstances, that XVIII. would admit of a “great mass” of Mount Everest being seen.

“And yet that Devadhangha, &c., *is seen* from the ‘confines’ of the valley, and that it *is a ‘great mass,’* we have Mr. Hodgson’s evidence to shew. That gentleman has therefore demonstrated, at least, that Mount Everest and Devadhangha are not identical.

“I have seen Mount Everest, certainly from near Titalia in Purneah, very probably from other districts along the Terai. It never struck me as a great mass.

“(Signed) J. B. N. HENNESSY,

“2nd Asst. G. T. Survey of India.”

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*Memo. by J. W. Armstrong, Esq.,*

*Civil Asst. G. T. Survey of India.*

In compliance with Department Orders No. 10267 by the Surveyor General of India, under date the 22nd April, 1857, I beg leave to submit the following remarks on the question which has been mooted regarding the identity of Mount Everest with Deodangha vel Bhairavathan.

This lofty pinnacle of the Himalayas was observed by me in 1846, from a distance of above 200 miles, and by Col. Waugh and Messrs.

Lane and Nicholson from different stations of the North East Longitudinal Series, and characterized by each according to the nomenclature which each had adopted. When the observations were all collected, and the snow points discussed and arranged in order from east to west, this lofty peak was characterized by the numeral XV. There were no means of ascertaining either the name of this mountain, or the names of the others which were observed; and when its stupendous height was finally determined, a name was sought for to stamp its greatness, and none presented itself, in the absence of its own local appellation, more fitting than that of our renowned ex-Surveyor General.

This nomination has been impugned by Mr. Hodgson on the strength of certain data advanced by him in the Journal of the Asiatic Society of Bengal, data which cannot be received as conclusive, because they are purely conjectural.

“The first datum is a *conjectural bearing and distance from positions never visited*.

“The other data are the itineraries of two Nepaulese Embassies to Peking, the distances of whose routes are equally conjectural. Mountainous as these routes must have been, and tortuous from the nature of the country, the distances noted as traversed must have been calculated not so much by linear measure, as by the difficulties encountered and the delays entailed.

“Independent of these objections, this lofty snow peak is neither visible from the valley of Nepaul on account of an intervening though lower snow mount, nor even from the confines of Sikkim, for a similar reason. And great as Mr. Hodgson’s knowledge of the mountainous region of Nepaul may be, his authority on the question at issue can be received only with diffidence, because it is enunciated without personal observation, and based upon the vague information of untrained travellers.

“ (Signed) J. W. ARMSTRONG,  
“ *Civil Asst. G. T. Survey,*”

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*Memo. by Lieut. J. F. Tennant, Engrs., 1st Asst. G. T. Survey in charge of Jogi Tila Merl. Series.*

During the identification of Col. Crawford’s Peaks, and the dis-

cussion of the identity of Mount Everest with Deodangha, I have paid a good deal of attention to the question.

There are no means of knowing the position of Deodangha beyond what are given by Mr. Hodgson. These consist 1st of an Itinerary by the two Nepaulese Embassies to Pekin, and 2nd of a paper on the seven Kosis, 3rd, several assertions for which no evidence is produced in a letter to the Secretary of the Asiatic Society of Bengal.

As regards the first, or the itineraries, I believe no person who has had any surveying experience can doubt their being absolutely useless as evidence of any thing but the existence of a Pass called Bhairava Langur. Mr. Hodgson supplies the information that it is identical in name with the adjacent mountain, which is, I conclude, derived from information. It is absolutely necessary for using a Route Survey that both bearings and linear distances should be given. The former in these routes are totally deficient. The latter are given along the road, which in mountainous countries would only be useful, had nature so formed the passes that they should all lie in a straight line and be reached one from another by a nearly level straight line. The document in question bears evidence that this is not the case, for by the route distance (117 miles) Mount Everest is far within Bhairava Langur, and this assumes the identity of their directions. If the itinerary is competent to determine the position of Bhairava Langur, it is equally so to determine that of Pekin, and Mr. Hodgson would do Geometers a service by explaining the process.

In a note to page 478 of No. VI. of the Journal of the Asiatic Society of Bengal, Mr. Hodgson says that Bhairava Langur is visible from the confines of Nepaul Proper as a great mass. Now it is demonstrable that the summit of Mount Everest is not visible from Katmandu or any part of the valley of Nepal as a conspicuous or recognizable prominence, if indeed it at all tops the intervening snowy range. Mr. Hodgson also asserts that it is visible from the frontiers of Sikkim. It certainly is not visible from Kanglanamo, 13,000 feet high, being shut out by the shoulder of our peak XIII., and it is evident that the same result will be true all along the Singalilah range as far as Tonglo. I know that Mr. Hodgson asserts that it has no competitor for notice, but sound Geometry

contradicts Mr. Hodgson, and I for one prefer the evidence it gives to any that may be derived from the fallible rendering of fallible informants.

Mr. Hodgson further undertakes to find the name of any object whose bearing and distance he has. It may be possible in some cases, and possibly Dwalaghiri is one. I can only say, having surveyed myself among hills, that nothing is more fallacious than names given from a distance, even when an object is conspicuously visible. I myself believe that there is an identity between the mountains to which Capt. Webb and the G. T. Surveyors have assigned the name of Dwalaghiri, but far be it from me to assert that that is its veritable name.

Mr. Hodgson is not probably less fallible than his predecessors, and yet Col. Crawford places Dhayabang east of the meridian of Katmandu, nearly in the position of our peak XXV., whereas another authority (Kirkpatrick) places it far west of that meridian; and here, it is quite evident, that the same name would not be assigned to the same peak. That Mr. Hodgson can get a name to any peak, I believe, but that it will be the true name, I do not believe as a general rule.

2nd. Mr. Hodgson gives a memo. on the seven Kosis with a sketch.

The sketch has no scale, and is confessedly a roughly drawn document, not founded on Survey. It can therefore hardly be admitted as evidence of any thing, but I shall show reason to doubt its being in Mr. Hodgson's favor.

Mr. Hodgson in the paper asserts, 1st.—That there is a mountain called Bhairava Langur or Deodangha.

2nd.—That that mountain is the source of the Bhootia Kosi.

3rd.—That it is the same as Mount Everest of Col. Waugh.

4th.—That Mount Everest is in the place of the source of the Bhootia Kosi.

I have said there is presumptive evidence of the first assertion.

The second assertion rests solely on information which is not very reliable (as far as the experience of accurate Surveyors goes) at the best, and is peculiarly liable to error in this case, as the Bhootia Kosi is only one of several confluent streams, and has



never been seen, as far as I learn, in its separate form by any European. Consequently its course must be liable to great error.

Mount Everest is stated to be identical with the source of the River as the occupant of the same position; but if this position be untrustworthy, there is an end of this, and consequently the proposition, that both being sources of the same river are the same, falls to the ground.

The real result from this paper is that,

1st.—There is a mountain called Deodangha, the source of a river

2nd.—That a stream called the Bhootia Kosi comes from a snowy mountain.

3rd.—That the coincidence of these two mountains is to say the best, subject to doubt, and

4th.—That there is no evidence to show the Latitude, Longitude and height of Deodangha and Mount Everest to be identical at all.

If the sketch map be a true representation of the course of the streams given, I believe Mr. Hodgson will be puzzled to find room for his other Kosis, giving each the feeding area necessary for its size.

If the mountain Deodangha be a little north and east of the Kuti pass, unless that has been grossly misplaced by all the Geographers who have exercised their talents on it, Deodangha is *not* Mount Everest.

I am aware that Mr. Hodgson says, he has explained the identity to the Society; but I see no evidence to satisfy a Geographer, and were any evidence wanting to show a pre-judgment of the case, we have his own letter, from which I quote as follows:—

“A few words more may be given to the last point, as being the matter which chiefly forced my attention as a Political Officer in Nepal, on the site of Mount Everest, and enabled me in after years, when I heard surmises (from, I think, Col. Waugh himself, or from some of his subordinates) of the great height of a peak in that direction to fix on Deodangha vel Bhairavathan (both names are used) as being the enormous snow mass in question, and I have often of late repeated this here very recently to Mr. Blanford.” All which demonstrates that before Mount Everest was named, or its definite position fixed, Mr. Hodgson had committed himself by repeated assertions of the identity of the forthcoming highest peak

and Bhairavathan, an admission in itself sufficient to render all his evidence valueless.

Having got this fixed idea, Mr. Hodgson next collected data for Bhairavathan or Deodangha indefinite in themselves, and which might apply to any mountain peak within a considerable range, including Mount Everest of course. On only one of these or rather on a class of them, I think further comment necessary.

The position of Mount Everest is connected with that of Gosainthan as a known point; but I have shown that name is not an evidence of identity. Further, the position of Gosainthan given in the Physical Geography of the Himalayas is not that generally given even as regards Kathmandu. Thirdly, that the longitude of Kathmandu itself is uncertain to a small extent, and was so to a great amount, till the identification of Col. Crawford's peaks with ours, reduced the limit, all which tells on the position of Deodangha.

On the whole, we have no evidence that Mr. Hodgson ever saw Mount Everest, or that any one else ever recognised its pre-eminent height, for contrary to Mr. Hodgson's repeated assumptions, it is demonstrably not a very conspicuous mass from a distance. There is a wide difference between the manner in which the known names have been given and that in which it is proposed to force this on us. All the points to which names have been given are laid down by competent Surveyors under those names, in most cases by some of the men who have fixed the final position. Deodangha has never been so defined, and even on Mr. Hodgson's showing the names may be those of passes or mountain masses, or particular prominences.

Mount Everest is the assigned name of a protuberance of no very large extent, and it would be most inadvisable in my opinion to abandon this definite name, which will soon be familiar to every English or European child, for one of the—to Europeans,—unpronounceable names given by Mr. Hodgson, whose application is, to say the least, extremely doubtful, and whose misapplication would cause endless confusion.

(Signed)

J. F. TENNANT, *Lieut., Engrs.*

*1st Asst. G. T. Survey.*



The Librarian and the Zoological Curator submitted their usual monthly reports.

#### LIBRARY.

The Library has received the following accessions during October last.

#### *Presented.*

Proceedings of the Royal Society, Vol. VIII. No. 26.—BY THE SOCIETY.

Ditto of the Royal Geographical Society of London, No. IX. for April and May, 1857.—BY THE SOCIETY.

Mantie uttair ov le langage des Oiseaux, Poëme de Philosophie Religieuse, Par Farid-Uddin Attar, Publié en Persan Par M. Garein de Tassy, *Paris*, 1857.—BY THE AUTHOR.

The Quarterly Journal of the Geological Society, Vol. XIII. No. 51, Part 3, August, 1857.—BY THE SOCIETY.

Vendidad Sadé, Craduit en Langue Huzvaresch du Pehlewie. Texte Autographe d' apres les Manuscrits Zend Pehlewis de la Bibliotheque Impériale de Paris, *Paris*, 1 and 2 Livraison. *Sheets* 1855, 2 copies.—BY THE IMPERIAL LIBRARY.

Abú'l-Mahásin 'Ibn Tagri Bardii Annales, quibus titulus est

النجوم الزاهرة , في ملوك مصر والقاهرة

e Codd. MSS. nunc primum Arabice editi. Tomi III. Partem priorem, edidit T. G. J. Juynboll. Lugduni Batavorum, 1857. 1 Copy.—BY THE ACADEMY.

Zietschrift der deutschen Morgenländischen Gessellschaft, Band II. heft 3.—BY THE GERMAN ORIENTAL SOCIETY.

Vividhárta Sañgraha, No. 41.—BY BABU RA'JENDRALA'L MITTRA.

The Calcutta Christian Observer for Oct. 1857.—BY THE EDITORS.

The Oriental Baptist for Oct. 1857.—BY THE EDITOR.

The Oriental Christian Spectator for Sept. 1857.—BY THE EDITOR.

Proceedings of the Trevandrum Museum Society, 23rd Dec. to 21st Feby. 1856.—BY THE SOCIETY.

Report on the Observatories of His Highness the Maha Raja of Travancore, at Trevandrum, and on the Agustier Peak of the Western Ghats, by J. A. Broun, *pamphlet*, 1857.—BY THE MADRAS GOVT.

Recueil des Actes de l'Académie Impériale des Sciences, Belles lettres et Arts de Bordeaux, 2nd Trimestre, 1856.—BY THE ACADEMY.

*Exchanged.*

The Athenæum for July, 1857.

The London, Edinburgh and Dublin Philosophical Magazine, and Journal of Science, No. 91, August, 1857.

The Calcutta Review, No. 57, Sept. 1857.

Annalen der Chemie und Pharmacie, June, 1857.

*Purchased.*

Annales des Sciences Naturelles, Tome VI. No. 5.

Comptes Rendus, Nos. 24 to 26 and Nos. 1 to 4, July 1857.

Literary Gazette, Nos. 2113 to 2116, and a duplicate copy No. 2088.

The American Journal of Science and Arts, No. 70, July, 1857.

The Annals and Magazine of Natural History, No. 116, Aug. 1857 and an old No. 102 to supply the file.

Revue des Deux Mondes, 15th July and 1st Aug. 1857.

Revue et Magasin de Zoologie, No. 6, 1857.

Journal des Savants, June and July, 1857.

The Quarterly Review, No. 203, July 1857.

On the Variation of Species with special reference to the Insects; followed by an enquiry into the nature of Geuera, by T. V. Wollaston, London, 1856, 12mo.

The Kingdom and People of Siam; with a narrative of the Mission to that country in 1855. By Sir John Bowring. London 8vo. 2 vols.

Bratárká—a Sanskrit printed Seetee, on the subject of the religious vows of Hindus, *sheets*, edited by Jaleelwauld Pundit.

Abú'l-Mahásin 'Ibn Tagri Bardii Annales, quibus titulus est

النجوم الزاهرة , قي ملوك مصر والقاهرة

e Codd. MSS. nunc primum Arabice editi. Tomi Ilii. Partem priorem, edidit T. G. J. Juynboll. Lugduni Batavorum, 1857. 1 Copy.

Symbolæ ad rem numariam Muhammedanorum. Edidit Carolus Johannes Tornberg, III. Upsaliæ, 1856, pamphlet.

*Report of Curator, Zoological Department.*

From C. G. T. Lloyd, Esq. of Bryn Estyn, New Norfolk, Tasmania, the following collection, of which the species new to our museum are distinguished by an asterisk.

*Mammalia.*

*HYDROMYS CHRYSOGASTER*, Geoffroy. Far more brightly coloured than specimens from Pt. Philip in our collection, presented in 1846 by Mr. Benson. *N. B.*—Mr. Gould, if we mistake not, figures about five races of *HYDROMYS* as distinct species.

*DASYURUS VIVERRINUS*, (Shaw). Two brown specimens. *N. B.*—Both this and a distinct species with spotted tail (*D. MACULATUS*) inhabit Tasmania, and we have both in the museum.

*PHALANGISTA VULPINA*, (Shaw). Three fine specimens; two of the ordinary colouring, similar to examples from Pt. Philip and N. S. Wales; the third melanoid, and illustrating the *Ph. fuliginosa*, Ogilby.

\**PHASCALOMYS WOMBAT*, Peron and Lesueur. A very fine skin of this extraordinary rodent marsupial.

*ORNITHORHYNCHUS ANATINUS*, Shaw.

*Aves.*

*EUPHEMA CHRYSOSTOMA*, Wagler. Two specimens.

*LATHAMUS DISCOLOR*, (Shaw). Ditto.

*GLOSSOPTILA AUSTRALIS*, (Lath.). Ditto.

*IERACIDEA BERIGORA*, (Vigors and Horsfield).

*CUCULUS INORNATUS*, Vigors and Horsfield. Ditto.

\**PODARGUS CUVIERI*, Gould.

\**OREOCINCLA LUNULATA*, (Latham).\*

*PETROICA PHENICEA*, Gould. Two specimens.

\**CALAMANTHUS FULIGINOSUS*, Gould.

*CINCLOSOMA PUNCTATUM*, (Lath.) Two specimens.

\* This difficult group of Thrushes has been elucidated by the Prince of Canino, in the 'Revue et Magasin de Zoologie,' No. 5 for 1857: but His Highness had not examined the *O. NILGIRIENSIS*, nobis, which is a particularly well characterized species. It most nearly resembles *O. LUNULATA*; but the colouring of the upper-parts is much more ruddy; the tail (of 12 feathers) is 1 in. shorter, and instead of being slightly emineiform, tends rather to be subfureate, but with its outermost feathers a trifle shorter than the rest; the bill, as long as in *O. LUNULATA*, is very much more slender, and the tip of the upper mandible is more prolonged; the tarse also is conspicuously shorter; and the small first primary is more developed. Length of wing 5 in.; of tail  $3\frac{1}{2}$  in.; bill to gape  $1\frac{1}{2}$  in.; tarse 1 in.; and short first primary  $1\frac{3}{8}$  in. Lower mandible of a pale colour. In three mottle-backed species under examination, viz. *O. DAUMA* (from the Hindustani word *dâma*, 'a Thrush'), *O. LUNULATA*, and *O. NILGIRIENSIS*, the distinctions are exceedingly well marked.

ARTAMUS SORDIDUS, (Lath.)

ANTHOCHÆRA INAURIS, Gould. Two specimens.

PTILOTTIS FLAVIGULA, (Gmelin.) Ditto.

MELIORNIS NOVÆ HOLLANDIÆ, (Latham.)

MANORHINA GARRULA, (Latham.)

\*SCOLOPAX AUSTRALIS, Gould.

TRIBONYX MORTIERI, Dubus.

### *Reptilia.*

CYCLODUS GIGAS, Boddaërt.

From the Hon'ble W. Elliot, C. S., Madras. The skin of a Marten, forwarded on loan through Mr. Grote, *habitat* not stated. It represents a fourth race of the MARTES FLAVIGULA type; equivalent to those of the Squirrels which are brought together by Prof. Temminck under the general name of SCIUREUS GIGANTEUS, but which most systematists recognise under different names. These races are as follow:

1. MARTES FLAVIGULA of the Himalāya and mountains of Arakan. Blackish-brown face, cheeks, and nape, abruptly demarcated; chin and throat white: breast and fore-part of the body pale yellowish-brown, mostly darker along the middle of the back, and passing to blackish-brown on the croup, fore-limbs, hind-quarters, and tail.

2. M. GWATKINSII, A. Smith, of the Nilgiris. Entire upper-parts blackish-brown, with the white throat and yellowish breast of the last. In other respects similar.

3. M. FLAVIGULA apud Cantor, from the Malayan peninsula. Similar to No. 1, but the fur much shorter, and tail consequently less bushy; the blackish cap merely indicated by pale-brown, but with a perephryal dark line passing from behind each ear. Of this race I have seen numerous specimens, all true to the particular colouring.

4. M. Elliot's animal. Upper-parts nearly uniform brown, paler on the sides, chin, throat, and breast, as on the others; the lower-parts dark, with some irregular blackish spots between the fore-limbs: perephryal blackish mark behind the ear, continued less distinctly forward; the brown of the crown and nape less dark than in No. 1, and continued uniformly on the shoulders and croup, scarcely paling along the middle of the back: tail much browner than in the others, and the limbs scarcely so dark. Possibly a variety of No. 2.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |      |       |
|-------|-------------------------------------------------|-------------------------------------------|---------|---------|-------------------------------|-----------------------------------------------|------|-------|
|       |                                                 | Max.                                      | Min.    | Diff.   |                               | Max.                                          | Min. | Diff. |
|       | Inches.                                         | Inches.                                   | Inches. | Inches. | o                             | o                                             | o    | o     |
| 1     | 29.794                                          | 29.868                                    | 29.733  | 0.135   | 84.1                          | 93.6                                          | 76.8 | 16.8  |
| 2     | .780                                            | .860                                      | .710    | .150    | 84.4                          | 94.0                                          | 78.2 | 15.8  |
| 3     | .793                                            | .857                                      | .733    | .124    | 84.2                          | 93.6                                          | 78.4 | 15.2  |
| 4     | .817                                            | .914                                      | .733    | .181    | 84.3                          | 92.6                                          | 77.6 | 15.0  |
| 5     | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 6     | .854                                            | .929                                      | .773    | .156    | 81.9                          | 90.6                                          | 76.7 | 13.9  |
| 7     | .854                                            | .932                                      | .730    | .202    | 78.9                          | 89.2                                          | 70.0 | 19.2  |
| 8     | .858                                            | .932                                      | .778    | .154    | 77.0                          | 85.6                                          | 70.6 | 15.0  |
| 9     | .835                                            | .905                                      | .737    | .168    | 78.2                          | 87.2                                          | 69.4 | 17.8  |
| 10    | .794                                            | .866                                      | .696    | .170    | 81.0                          | 90.2                                          | 74.0 | 16.2  |
| 11    | .778                                            | .848                                      | .669    | .179    | 81.6                          | 92.8                                          | 71.6 | 21.2  |
| 12    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 13    | .699                                            | .771                                      | .632    | .139    | 84.1                          | 93.8                                          | 77.0 | 16.8  |
| 14    | .699                                            | .772                                      | .632    | .140    | 84.4                          | 94.6                                          | 76.6 | 18.0  |
| 15    | .698                                            | .775                                      | .606    | .169    | 86.6                          | 96.2                                          | 79.8 | 16.4  |
| 16    | .624                                            | .720                                      | .528    | .192    | 87.7                          | 98.4                                          | 80.2 | 18.2  |
| 17    | .622                                            | .687                                      | .565    | .122    | 88.5                          | 98.1                                          | 81.2 | 16.9  |
| 18    | .700                                            | .769                                      | .644    | .125    | 86.7                          | 94.8                                          | 81.0 | 13.8  |
| 19    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 20    | .727                                            | .794                                      | .663    | .131    | 85.0                          | 92.5                                          | 77.0 | 15.5  |
| 21    | .748                                            | .829                                      | .671    | .158    | 82.8                          | 93.8                                          | 75.0 | 18.8  |
| 22    | .780                                            | .864                                      | .698    | .166    | 79.9                          | 89.7                                          | 71.1 | 18.6  |
| 23    | .824                                            | .911                                      | .693    | .218    | 76.3                          | 84.8                                          | 71.3 | 13.5  |
| 24    | .802                                            | .893                                      | .728    | .165    | 79.5                          | 89.8                                          | 69.5 | 20.3  |
| 25    | .786                                            | .860                                      | .698    | .162    | 83.0                          | 92.0                                          | 75.6 | 16.4  |
| 26    | <i>Sunday.</i>                                  |                                           |         |         |                               |                                               |      |       |
| 27    | .731                                            | .792                                      | .660    | .132    | 85.7                          | 94.8                                          | 78.5 | 16.3  |
| 28    | .789                                            | .872                                      | .703    | .169    | 83.9                          | 94.3                                          | 74.6 | 19.7  |
| 29    | .722                                            | .806                                      | .633    | .173    | 85.4                          | 96.0                                          | 77.0 | 19.0  |
| 30    | .655                                            | .732                                      | .563    | .169    | 87.3                          | 98.8                                          | 79.8 | 19.0  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew Point. | Mean Elastic force of Vapour. | Mean Weight of Vapour in a cubic foot of Air. | Additional Weight of Vapour required for complete saturation. | Mean degree of Humidity, complete saturation being unity. |
|-------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|       | °                          | °                   | °                   | °                         | Inches.                       | T. gr.                                        | T. gr.                                                        |                                                           |
| 1     | 77.2                       | 6.9                 | 73.7                | 10.4                      | .0819                         | 8.78                                          | 3.43                                                          | .072                                                      |
| 2     | 77.5                       | 6.9                 | 74.0                | 10.4                      | .827                          | .86                                           | .45                                                           | .72                                                       |
| 3     | 77.9                       | 6.3                 | 74.7                | 9.5                       | .846                          | 9.05                                          | .19                                                           | .74                                                       |
| 4     | 77.1                       | 7.2                 | 73.5                | 10.8                      | .814                          | 8.70                                          | .58                                                           | .71                                                       |
| 5     | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 6     | 72.4                       | 9.5                 | 67.6                | 14.3                      | .672                          | 7.23                                          | 4.21                                                          | .63                                                       |
| 7     | 73.1                       | 5.8                 | 70.2                | 8.7                       | .732                          | .91                                           | 2.56                                                          | .76                                                       |
| 8     | 71.5                       | 5.5                 | 68.7                | 8.3                       | .677                          | .57                                           | .32                                                           | .77                                                       |
| 9     | 71.9                       | 6.3                 | 68.7                | 9.5                       | .697                          | .54                                           | .71                                                           | .74                                                       |
| 10    | 75.8                       | 5.2                 | 73.2                | 7.8                       | .806                          | 8.68                                          | .46                                                           | .78                                                       |
| 11    | 76.2                       | 5.4                 | 73.5                | 8.1                       | .814                          | .76                                           | .58                                                           | .77                                                       |
| 12    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 13    | 78.2                       | 5.9                 | 75.2                | 8.9                       | .860                          | 9.20                                          | 3.01                                                          | .75                                                       |
| 14    | 78.4                       | 6.0                 | 75.4                | 9.0                       | .865                          | .26                                           | .05                                                           | .75                                                       |
| 15    | 80.1                       | 6.5                 | 76.8                | 9.8                       | .905                          | .63                                           | .51                                                           | .73                                                       |
| 16    | 79.7                       | 8.0                 | 75.7                | 12.0                      | .873                          | .28                                           | 4.28                                                          | .68                                                       |
| 17    | 78.1                       | 10.4                | 72.9                | 15.6                      | .797                          | 8.45                                          | 5.43                                                          | .61                                                       |
| 18    | 80.4                       | 6.3                 | 77.2                | 9.5                       | .916                          | 9.75                                          | 3.43                                                          | .74                                                       |
| 19    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 20    | 78.7                       | 6.3                 | 75.5                | 9.5                       | .868                          | .27                                           | .26                                                           | .74                                                       |
| 21    | 74.8                       | 8.0                 | 70.8                | 12.0                      | .746                          | 8.00                                          | .75                                                           | .68                                                       |
| 22    | 74.8                       | 5.1                 | 72.2                | 7.7                       | .781                          | .41                                           | 2.37                                                          | .78                                                       |
| 23    | 70.1                       | 6.2                 | 67.0                | 9.3                       | .659                          | 7.17                                          | .52                                                           | .74                                                       |
| 24    | 72.4                       | 7.1                 | 68.8                | 10.7                      | .699                          | .54                                           | 3.12                                                          | .71                                                       |
| 25    | 76.4                       | 6.6                 | 73.1                | 9.9                       | .803                          | 8.61                                          | .21                                                           | .73                                                       |
| 26    | <i>Sunday.</i>             |                     |                     |                           |                               |                                               |                                                               |                                                           |
| 27    | 78.9                       | 6.8                 | 75.5                | 10.2                      | .868                          | 9.27                                          | .53                                                           | .72                                                       |
| 28    | 76.0                       | 7.9                 | 72.0                | 11.9                      | .776                          | 8.30                                          | .83                                                           | .68                                                       |
| 29    | 76.0                       | 9.4                 | 71.3                | 14.1                      | .758                          | .10                                           | 4.58                                                          | .64                                                       |
| 30    | 78.9                       | 8.4                 | 74.7                | 12.6                      | .846                          | .99                                           | .42                                                           | .67                                                       |

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fabt. | Range of the Barometer for<br>each hour during the<br>month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture for each hour<br>during the<br>month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|---------------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                                | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                                   | o    | o     |
| Mid-<br>night. | 29.760                                          | 29.863                                                       | 29.577  | 0.286   | 78.8                          | 83.6                                                                | 71.4 | 12.2  |
| 1              | .751                                            | .854                                                         | .574    | .280    | 78.4                          | 83.2                                                                | 70.7 | 12.5  |
| 2              | .738                                            | .846                                                         | .566    | .280    | 78.1                          | 83.2                                                                | 70.6 | 12.6  |
| 3              | .739                                            | .862                                                         | .571    | .291    | 77.5                          | 83.0                                                                | 70.4 | 12.6  |
| 4              | .749                                            | .855                                                         | .621    | .234    | 76.9                          | 81.0                                                                | 69.4 | 11.6  |
| 5              | .753                                            | .860                                                         | .608    | .252    | 76.9                          | 81.6                                                                | 69.4 | 12.2  |
| 6              | .776                                            | .895                                                         | .617    | .278    | 76.7                          | 81.2                                                                | 69.7 | 11.5  |
| 7              | .798                                            | .906                                                         | .648    | .258    | 77.7                          | 82.0                                                                | 71.0 | 11.0  |
| 8              | .822                                            | .919                                                         | .667    | .252    | 80.6                          | 85.0                                                                | 74.1 | 10.9  |
| 9              | .832                                            | .930                                                         | .680    | .250    | 83.6                          | 88.2                                                                | 75.6 | 12.6  |
| 10             | .830                                            | .932                                                         | .687    | .245    | 85.9                          | 91.0                                                                | 76.7 | 14.3  |
| 11             | .818                                            | .918                                                         | .681    | .237    | 88.4                          | 93.4                                                                | 78.0 | 15.4  |
| Noon.          | .799                                            | .905                                                         | .668    | .237    | 89.9                          | 95.2                                                                | 79.6 | 15.6  |
| 1              | .766                                            | .885                                                         | .636    | .249    | 91.4                          | 96.6                                                                | 81.6 | 15.0  |
| 2              | .736                                            | .846                                                         | .600    | .246    | 92.3                          | 97.8                                                                | 84.3 | 13.5  |
| 3              | .710                                            | .838                                                         | .570    | .268    | 92.3                          | 98.8                                                                | 83.2 | 15.6  |
| 4              | .687                                            | .814                                                         | .548    | .266    | 91.4                          | 98.4                                                                | 80.4 | 18.0  |
| 5              | .682                                            | .802                                                         | .529    | .273    | 89.3                          | 96.8                                                                | 80.0 | 16.8  |
| 6              | .697                                            | .814                                                         | .528    | .286    | 85.9                          | 92.0                                                                | 75.4 | 16.6  |
| 7              | .720                                            | .834                                                         | .541    | .293    | 83.4                          | 89.3                                                                | 71.8 | 17.5  |
| 8              | .753                                            | .864                                                         | .574    | .290    | 81.7                          | 86.4                                                                | 70.6 | 15.8  |
| 9              | .776                                            | .898                                                         | .591    | .307    | 80.1                          | 85.0                                                                | 70.0 | 15.0  |
| 10             | .775                                            | .922                                                         | .602    | .320    | 79.1                          | 84.2                                                                | 70.0 | 14.2  |
| 11             | .773                                            | .932                                                         | .598    | .334    | 78.5                          | 84.1                                                                | 70.4 | 13.7  |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic Force<br>of Vapour. | Mean Weight of Va-<br>pour in a cubic<br>foot of Air. | Additional Weight of<br>Vapour required<br>for complete satu-<br>ration. | Mean degree of Hu-<br>midity, complete<br>saturation being<br>unity. |
|----------------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                | o                               | o                   | o                   | o                            | Inches.                          | T. gr.                                                | T. gr.                                                                   |                                                                      |
| Mid-<br>night. | 75.2                            | 3.6                 | 73.4                | 5.4                          | 0.811                            | 8.78                                                  | 1.66                                                                     | 0.84                                                                 |
| 1              | 74.9                            | 3.5                 | 73.1                | 5.3                          | .803                             | .70                                                   | .61                                                                      | .84                                                                  |
| 2              | 74.7                            | 3.4                 | 73.0                | 5.1                          | .801                             | .67                                                   | .55                                                                      | .85                                                                  |
| 3              | 74.2                            | 3.3                 | 72.5                | 5.0                          | .787                             | .54                                                   | .50                                                                      | .85                                                                  |
| 4              | 73.9                            | 3.0                 | 72.4                | 4.5                          | .785                             | .51                                                   | .35                                                                      | .86                                                                  |
| 5              | 74.1                            | 2.8                 | 72.7                | 4.2                          | .792                             | .61                                                   | .25                                                                      | .87                                                                  |
| 6              | 73.9                            | 2.8                 | 72.5                | 4.2                          | .787                             | .56                                                   | .24                                                                      | .87                                                                  |
| 7              | 74.6                            | 3.1                 | 73.0                | 4.7                          | .801                             | .67                                                   | .43                                                                      | .86                                                                  |
| 8              | 75.9                            | 4.7                 | 73.5                | 7.1                          | .814                             | .78                                                   | 2.23                                                                     | .80                                                                  |
| 9              | 76.8                            | 6.8                 | 73.4                | 10.2                         | .811                             | .69                                                   | 3.34                                                                     | .72                                                                  |
| 10             | 77.6                            | 8.3                 | 73.4                | 12.5                         | .811                             | .64                                                   | 4.23                                                                     | .67                                                                  |
| 11             | 78.1                            | 10.3                | 72.9                | 15.5                         | .797                             | .45                                                   | 5.39                                                                     | .61                                                                  |
| Noon.          | 78.2                            | 11.7                | 72.3                | 17.6                         | .783                             | .27                                                   | 6.19                                                                     | .57                                                                  |
| 1              | 79.0                            | 12.4                | 72.8                | 18.6                         | .795                             | .38                                                   | .72                                                                      | .56                                                                  |
| 2              | 79.1                            | 13.2                | 72.5                | 19.8                         | .787                             | .28                                                   | 7.22                                                                     | .53                                                                  |
| 3              | 78.5                            | 13.8                | 71.6                | 20.7                         | .766                             | .05                                                   | .45                                                                      | .52                                                                  |
| 4              | 78.3                            | 13.1                | 71.7                | 19.7                         | .768                             | .09                                                   | .01                                                                      | .54                                                                  |
| 5              | 78.3                            | 11.0                | 72.8                | 16.5                         | .795                             | .41                                                   | 5.80                                                                     | .59                                                                  |
| 6              | 77.9                            | 8.0                 | 73.9                | 12.0                         | .824                             | .79                                                   | 4.08                                                                     | .68                                                                  |
| 7              | 76.5                            | 6.9                 | 73.0                | 10.4                         | .801                             | .58                                                   | 3.38                                                                     | .72                                                                  |
| 8              | 75.9                            | 5.8                 | 73.0                | 8.7                          | .801                             | .60                                                   | 2.77                                                                     | .76                                                                  |
| 9              | 75.1                            | 5.0                 | 72.6                | 7.5                          | .790                             | .52                                                   | .32                                                                      | .79                                                                  |
| 10             | 74.7                            | 4.4                 | 72.5                | 6.6                          | .787                             | .51                                                   | .02                                                                      | .81                                                                  |
| 11             | 74.2                            | 4.3                 | 72.0                | 6.5                          | .776                             | .38                                                   | 1.97                                                                     | .81                                                                  |

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind.          | General Aspect of the Sky.                                                                                         |
|-------|-----------------------|---------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                            |                                                                                                                    |
| 1     | 130.5                 | ..                              | S.                                         | Cloudless till Noon, scatd. ☽ till 9 P. M. cloudless afterwards.                                                   |
| 2     | 132.0                 | ..                              | S.                                         | Cloudless till 1 P. M. scattered ☽ or ☽ till 6 P. M. cloudless afterwards.                                         |
| 3     | 135.0                 | ..                              | S.                                         | Flying clouds the whole day.                                                                                       |
| 4     | 128.0                 | ..                              | S.                                         | Cloudy.                                                                                                            |
| 5     | <i>Sunday.</i>        |                                 |                                            |                                                                                                                    |
| 6     | 127.0                 | ..                              | S. & S. W.                                 | Cloudy.                                                                                                            |
| 7     | 109.2                 | 1.13                            | S.                                         | Cloudy, also raining & thundering & lightning between 7 P. M. & midnight.                                          |
| 8     | 124.0                 | ..                              | Variable.                                  | Cloudy till 7 P. M. cloudless afterwards.                                                                          |
| 9     | 135.4                 | ..                              | S. & W. & S. W.                            | Cloudy the whole day; also drizzling between 3 & 6 A. M. & also at 8 P. M.                                         |
| 10    | ..                    | 0.15                            | S.                                         | Cloudy, also raining at 6 P. M.                                                                                    |
| 11    | 138.5                 | ..                              | S.                                         | Cloudless at 8 A. M. scatd. ☽ afterwards, also raining at 8 P. M. also thunders and lightning between 8 & 11 P. M. |
| 12    | <i>Sunday.</i>        |                                 |                                            |                                                                                                                    |
| 13    | 129.0                 | ..                              | S.                                         | Scatd. clouds nearly the whole day, also drizzling at 7 P. M. [wards.                                              |
| 14    | 133.0                 | ..                              | S.                                         | Cloudless till 4 A. M. scatd. ☽ after.                                                                             |
| 15    | 131.0                 | ..                              | S.                                         | Cloudless nearly the whole day.                                                                                    |
| 16    | 136.0                 | ..                              | S.                                         | Cloudless.                                                                                                         |
| 17    | 147.0                 | ..                              | S.                                         | Cloudless. [wards.                                                                                                 |
| 18    | 131.7                 | ..                              | S.                                         | Cloudless till 3 A. M. scatd. clouds after.                                                                        |
| 19    | <i>Sunday.</i>        |                                 |                                            |                                                                                                                    |
| 20    | 124.0                 | ..                              | S. E.                                      | Cloudy.                                                                                                            |
| 21    | 130.0                 | 0.42                            | S.                                         | Cloudy & drizzling between 2 & 4 A. M. and also between 8 & 9 P. M.                                                |
| 22    | 125.0                 | 0.10                            | S.                                         | Cloudy, also rain at 8 P. M. also thundering & lightning from 8 P. M. to midnight.                                 |
| 23    | ..                    | ..                              | S. & N. W.                                 | Cloudy, also drizzling at 9 P. M.                                                                                  |
| 24    | 132.0                 | ..                              | S. E. & S.                                 | Cloudless till 4 A. M. scatd. clouds till 5 P. M. cloudless afterwards.                                            |
| 25    | 140.0                 | ..                              | S.                                         | Cloudy nearly the whole day.                                                                                       |
| 26    | <i>Sunday.</i>        |                                 |                                            |                                                                                                                    |
| 27    | 139.0                 | ..                              | S. & S. E.                                 | Cloudless till Noon, cloudy afterwards.                                                                            |
| 28    | 131.6                 | ..                              | S. (S. E. gale between midnight & 1 A. M.) | Cloudy, also thundering and lightning and raining before sunrise and also after sunset.                            |
| 29    | 139.0                 | ..                              | S.                                         | Cloudless.                                                                                                         |
| 30    | 141.0                 | ..                              | S. & S. W.                                 | Cloudless till 5 A. M. scatd. ☽ & ☽ till 5 P. M. cloudless afterwards.                                             |

☽ Cirri, ☽ Cirro strati, ☽ Cumuli, ☽ Cumulo strati, ☽ Nimbi, ☽ Strati, ☽ Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

## MONTHLY RESULTS.

|                                                                                          |    |    |    | Inches. |
|------------------------------------------------------------------------------------------|----|----|----|---------|
| Mean height of the Barometer for the month,                                              | .. | .. | .. | 29.760  |
| Max. height of the Barometer occurred at 10 A. M. on the 7th and<br>11 P. M. on the 8th, | .. | .. | .. | 29.932  |
| Min. height of the Barometer occurred at 6 P. M. on the 16th,                            | .. | .. | .. | 29.528  |
| Extreme range of the Barometer during the month,                                         | .. | .. | .. | 0.404   |

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|                                                      |    |    |    |      |
|------------------------------------------------------|----|----|----|------|
|                                                      |    |    |    | o    |
| Mean Dry Bulb Thermometer for the month,             | .. | .. | .. | 83.2 |
| Max. Temperature occurred at 3 P. M. on the 30th,    | .. | .. | .. | 98.8 |
| Min. Temperature occurred at 4 & 5 A. M. on the 9th, | .. | .. | .. | 69.4 |
| Extreme range of the Temperature during the month,   | .. | .. | .. | 29.4 |

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|                                                               |    |    |    |         |
|---------------------------------------------------------------|----|----|----|---------|
|                                                               |    |    |    | o       |
| Mean Wet Bulb Thermometer for the month,                      | .. | .. | .. | 76.2    |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, .. |    |    |    | 7.0     |
| Computed Mean Dew-point for the month, ..                     | .. | .. | .. | 72.7    |
| Mean Dry Bulb Thermometer above computed mean Dew-point,      | .. | .. | .. | 10.5    |
|                                                               |    |    |    | Inches. |
| Mean Elastic force of Vapour for the month,                   | .. | .. | .. | 0.792   |

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|                                                                         |    |    |    |              |
|-------------------------------------------------------------------------|----|----|----|--------------|
|                                                                         |    |    |    | Troy grains. |
| Mean Weight of Vapour for the month, ..                                 | .. | .. | .. | 8.49         |
| Additional Weight of Vapour required for complete saturation,           | .. | .. | .. | 3.40         |
| Mean degree of humidity for the month, complete saturation being unity, |    |    |    | 0.71         |

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|                                                    |    |    |    |         |
|----------------------------------------------------|----|----|----|---------|
|                                                    |    |    |    | Inches. |
| Rained 10 days, Max. fall of rain during 24 hours, | .. | .. | .. | 1.13    |
| Total amount of rain during the month,             | .. | .. | .. | 1.80    |
| Prevailing direction of the Wind,                  | .. | .. | .. | S.      |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind  
blew, together with the number of days on which at the same hour when  
any particular wind was blowing it rained.

| Hour.     | N.           | Rain on.<br>N. E. | Rain on.<br>E. | Rain on.<br>S. E. | S. | Rain on.<br>S. W. | Rain on.<br>W. | Rain on.<br>N. W. | Calm. | Rain on. |
|-----------|--------------|-------------------|----------------|-------------------|----|-------------------|----------------|-------------------|-------|----------|
|           | No. of days. |                   |                |                   |    |                   |                |                   |       |          |
| Midnight. |              | 1                 | 1              |                   | 4  | 21                |                |                   |       |          |
| 1         |              |                   |                |                   | 4  | 21                | 1              |                   | 1     |          |
| 2         |              |                   | 1              |                   | 3  | 20                | 1              |                   |       |          |
| 3         |              |                   |                |                   | 3  | 21                | 1              |                   |       |          |
| 4         |              | 2                 |                |                   | 2  | 19                | 1              |                   |       |          |
| 5         |              | 1                 | 3              |                   | 2  | 18                | 1              |                   |       |          |
| 6         |              | 1                 | 4              |                   | 3  | 13                | 1              |                   |       |          |
| 7         |              | 2                 | 3              |                   | 3  | 13                | 3              |                   |       |          |
| 8         |              | 1                 | 5              |                   | 3  | 13                | 3              |                   |       |          |
| 9         | 1            |                   | 3              |                   | 5  | 14                | 3              |                   |       |          |
| 10        |              |                   | 1              |                   | 3  | 14                | 7              |                   |       |          |
| 11        |              |                   |                |                   | 2  | 16                | 6              |                   |       |          |
| Noon.     |              |                   |                | 3                 | 1  | 15                | 6              | 2                 |       |          |
| 1         |              |                   |                | 2                 |    | 15                | 7              | 2                 |       |          |
| 2         |              |                   |                | 3                 |    | 14                | 6              | 3                 |       |          |
| 3         |              | 1                 |                | 2                 |    | 14                | 6              | 3                 |       |          |
| 4         |              |                   |                | 2                 |    | 18                | 6              |                   |       |          |
| 5         |              |                   |                | 6                 |    | 19                | 1              |                   |       |          |
| 6         | 1            |                   |                | 5                 |    | 19                | 1              |                   |       |          |
| 7         | 1            | 1                 | 2              | 3                 |    | 19                | 1              |                   |       |          |
| 8         | 2            | 1                 | 1              | 2                 |    | 16                |                | 1                 | 1     |          |
| 9         | 1            |                   |                | 3                 |    | 17                |                | 3                 | 1     |          |
| 10        |              | 1                 | 1              | 5                 |    | 15                |                | 1                 |       | 1        |
| 11        |              | 1                 | 1              | 4                 |    | 16                |                | 1                 |       |          |

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April, 1857.*

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On the 24th April, 1857, the Meteorological Observations after ten minutes intervals being taken at the Surveyor General's Office, they indicate the following circumstances.

|                      |                       |                                                                                      |    | h. m.      |   | h. m.        |
|----------------------|-----------------------|--------------------------------------------------------------------------------------|----|------------|---|--------------|
| <i>Exact Time of</i> | Minimum Barometer, .. | ..                                                                                   | .. | 2 30 A. M. | & | 4 35 P. M.   |
| Ditto                | Maximum Barometer, .. | ..                                                                                   | .. | 9 50 ditto | & | 10 40 ditto. |
| Ditto                | Minimum Temperature,  | { Between 5 20 & 5 30 A. M.<br>or qr. of an hour before sunrise.                     |    |            |   |              |
| Ditto                | Maximum Temperature,  | { Between 3 20 & 4 0 P. M.<br>during which time the Thermome-<br>ter was stationary. |    |            |   |              |









